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metals review

the news digest magazine

published by the american society for metals

Volume XXVII-No. 9 September, 1954

MORE FOR YOUR MONEY

HOLDEN SALT BATHS and INDUSTRIAL POT FURNACES

Holden Type 701 Electrode Furnaces

. . . provide these Important Advantages

1. Replaceable electrodes without any down time to repair or rebrick the wall.
2. 100% net working area with electrodes completely out of the work area.
3. No salt leakage. A completely welded steel shell to support the high temperature refractory.
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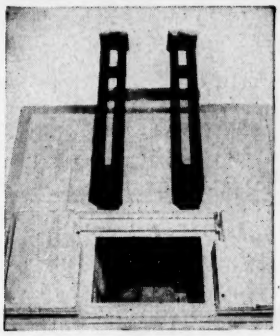
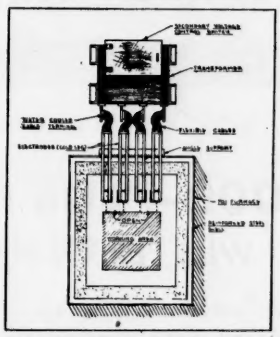
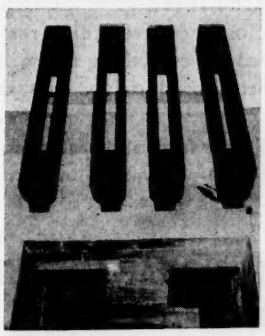


HOLDEN TYPE 701-2 Submerged Electrode Unit with removable electrodes.



Drawing of HOLDEN TYPE 701-4 Submerged Electrode Furnace.



HOLDEN TYPE 701-4 Submerged Electrode Unit with replaceable electrodes.

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★ *Write for descriptive literature on Holden Type 701 Electrode Furnace.*

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Metals Review

VOLUME XXVIII, No. 9 September, 1954

THE NEWS DIGEST MAGAZINE

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National Metal Congress & Exposition

Chicago Nov. 1-5

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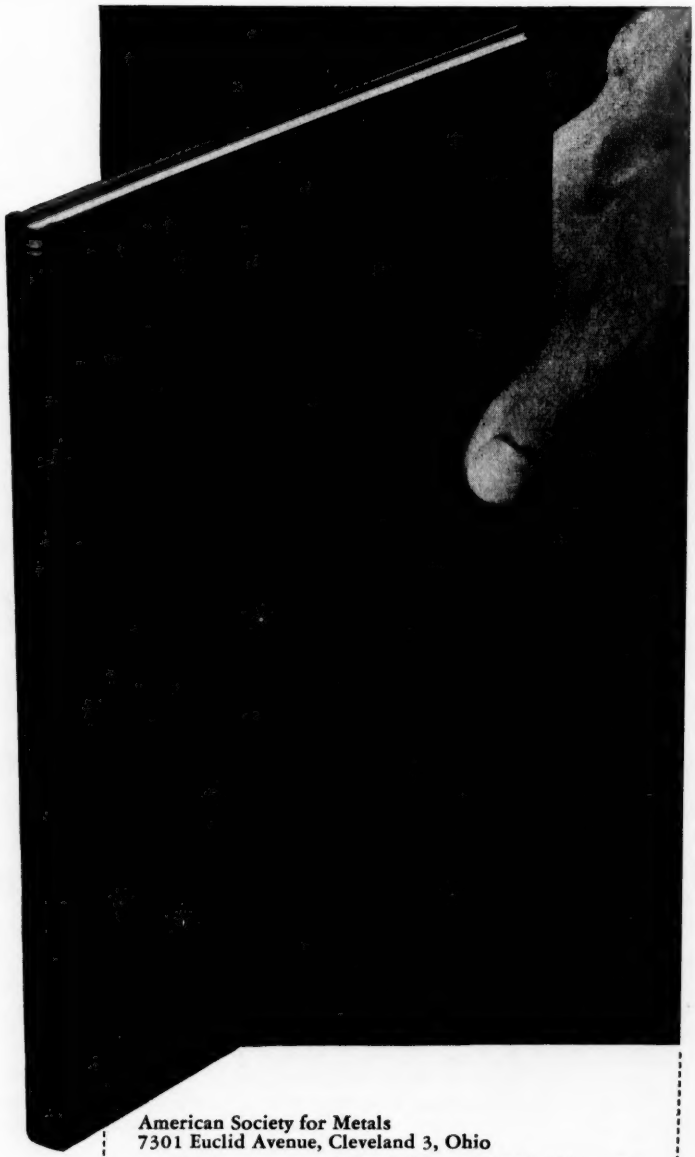
Metals Handbook New 1954 Supplement



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American Society for Metals

Technical Program
National Metal Congress
Chicago, Oct. 30-Nov. 5, 1954

(All Technical Sessions To Be Held at the Palmer House)

Monday, Nov. 1

9:30 a. m.—Ballroom

CONSTITUTIONAL DIAGRAMS

PRESIDING: B. W. Gonser
Battelle Memorial Institute
and J. E. Burke
General Electric Co.

Aluminum-Vanadium Alloy System, by O. N. Carlson, D. J. Kenney and H. A. Wilhelm, Iowa State College.

Partial Phase Diagram of the Iron-Cerium System, by James O. Jepson and Pol Duwez, California Institute of Technology.

Titanium-Cobalt System, by F. L. Orrell, Jr., Dow Chemical Co., and M. G. Fontana, Ohio State University.

System Titanium-Aluminum-Manganese, by R. F. Domagala and W. Rostoker, Armour Research Foundation of Illinois Institute of Technology.

Constitution of Ordering Alloys of the System Copper-Gold, by F. N. Rhines, W. E. Bond and R. A. Rummel, Carnegie Institute of Technology.

2:00 p. m.—Ballroom

MECHANICAL METALLURGY

PRESIDING: R. B. Johnson
General Electric Co.
and W. T. Lankford
United States Steel Corp.

Effect of Prestraining Under Different Stress States on the Fracture and Flow Properties of 2S-0 Aluminum, by I. Rozalsky, Shell Oil Co.

Deformation Mechanisms in Polycrystalline Aggregates of Magnesium, by F. E. Hauser, C. D. Starr, L. S. Tietz and J. E. Dorn, University of California.

Tensile and Impact Properties of Low-Carbon Martensites, by C. C. Busby and H. W. Paxton, Carnegie Institute of Technology, and M. F. Hawkes, U. S. Naval Ammunition Depot, Hawaii.

Tensile Characteristics of Unalloyed Zirconium at Low and Moderate Temperatures, by J. H. Keeler, General Electric Co.

2:00 p. m.—Red Lacquer Room

PROCESSING

PRESIDING: W. M. Baldwin
Case Institute of Technology
and L. P. Tarasov
Norton Co.

Influence of Chemical Composition on the Machinability of Rephosphorized Openhearth Screw Steel, by E. J. Paliwoda, Jones & Laughlin Steel Corp.

Influence of the Grinding Process on the Structure of Hardened Steel, by W. E. Littmann, Timken Roller Bearing Co., and John Wulff, Massachusetts Institute of Technology.

Zonal Rolling Texture of Low Carbon Steel Cold Rolled at Various Temperatures, by C. Nusbaum, Case Institute of Technology, and W. Brenner, Jr., Cold Metal Products Co.

Tuesday, Nov. 2

9:30 a. m.—Ballroom

HARDENABILITY

PRESIDING: R. D. Chapman
Chrysler Corp.
and F. T. McGuire
Deere & Co.

An Electron Metallographic Study of the Dependence of Microstructure on Hardenability, by S. T. Ross, R. P. Sernka and W. E. Jominy, Chrysler Corp.

Calculation of Hardenability in High Carbon Alloy Steels, by C. F. Jatczak and R. W. Devine, Jr., Timken Roller Bearing Co.

Hardenability of Carbon Toolsteel, by N. J. Culp, Carpenter Steel Co.

Effect of Carbon and Nitrogen on the Attainable Hardness of Martensitic Steels, by A. E. Nehrenberg, P. Payson and P. Lillys, Crucible Steel Co. of America.

2:00 p. m.—Ballroom

PHYSICAL METALLURGY

PRESIDING: M. J. Day
Armour Research Foundation
and V. H. Patterson
Climax Molybdenum Co.

Conditions for Dendritic Growth in Alloys, by W. Morris, W. A. Tiller, J. W. Rutter and W. C. Winegard, University of Toronto.

Stress-Corrosion Mechanism in a Magnesium-Base Alloy, by D. K. Priest, Pfaudler Co., and F. H. Beck and M. G. Fontana, Ohio State University.

Thermodynamics of Binary Interstitial Solid Solutions, by R. Speiser and J. W. Spretnak, Ohio State University.

Influence of Substructure on the Shape of the Creep Curve, by T. Hazlett and R. D. Hansen, University of California.

SEMINAR ON IMPURITIES AND IMPERFECTIONS

(All Meetings in Ballroom, Palmer House)

Saturday, Oct. 30

9:30 a. m.

Lattice Vacancies and Interstitials, by Harvey Brooks, Harvard University.

Dislocations, by J. C. Fisher, General Electric Co.

Grain Boundaries, Substructure and Impurities, by R. W. Cahn, University of Birmingham, England (Visiting Lecturer, Johns Hopkins University).

2:00 p. m.

Effects on Crystal Growth, by Bruce Chalmers, Harvard University.

Effects and Imperfections in Metallic Diffusion, by David Lazarus, University of Illinois.

Role of Structural Impurities on Phase Transformations, by David Turnbull, General Electric Co.

Sunday, Oct. 31

9:30 a. m.

Effects on Mechanical Properties, by E. R. Parker, University of California.

Effects on Electrical Properties, by J. S. Koehler, University of Illinois.

Effects on Chemical Properties, by W. D. Robertson, Yale University.

2:00 p. m.

Impurity Phenomena in Semiconductors, by J. A. Burton, Bell Telephone Laboratory.

Effects on Dielectrics and Ionic Crystals, by R. J. Maurer, University of Illinois.

Radiation Damage, by Frederick Seitz, University of Illinois.

Wednesday, Nov. 3

9:00 a. m.—Ballroom

ASM ANNUAL MEETING
and
CAMPBELL MEMORIAL LECTURE

Factors Affecting Directional Properties in Aluminum Wrought Products, by Kent R. Van Horn, Aluminum Co. of America

2:00 p. m.—Ballroom

MECHANICAL PROPERTIES

PRESIDING: A. L. Geisler
General Electric Co.
and M. F. Judkins
Firth Sterling, Inc.

Elastic Limit and Yield Behavior of Hardened Steels, by H. Muir, Otago University, Dunedin, New Zealand, and B. L. Averbach and Morris Cohen, Massachusetts Institute of Technology.

Effect of Composition on Transverse Properties of Slack-Quenched Steel, by J. Vajda and P. E. Busby, Carnegie Institute of Technology.

Statistical Fatigue Properties of Lamellar and Spheroidal Eutectoid Steel, by G. E. Dieter, Ordnance Corps, and R. F. Mehl and G. T. Horne, Carnegie Institute of Technology.

Effect of Static Stress on the Damping of Some Engineering Alloys, by A. W. Cochardt, Westinghouse Electric Corp.

Lecture Course on Temperature Measurement

(All Meetings in Room 14, Palmer House)

Monday, Nov. 1

4:30 p. m.

Industrial Temperature Measurement With Thermocouple Pyrometers, by W. E. Belcher, Jr., Minneapolis-Honeywell Regulator Co., Brown Instruments Div.

Tuesday, Nov. 2

4:30 p. m.

Industrial Temperature Measurement With Total Radiation and Optical Pyrometers, by Donald Robertson, Leeds and Northrup Co.

Wednesday, Nov. 3

4:30 p. m.

Industrial Temperature Measurement With Resistance Thermometers and Filled Systems, by W. F. Hickes, Foxboro Co.

2:00 p. m.—Red Lacquer Room

FERROUS PHYSICAL METALLURGY

PRESIDING: J. A. Berger
University of Pittsburgh
and R. A. Grange
United States Steel Corp.

Further Study of Microstructural Changes on Tempering Iron-Carbon Alloys, by B. S. Lement, B. L. Averbach and Morris Cohen, Massachusetts Institute of Technology.

Effects of Cold Work on Cementite in Steel, by D. V. Wilson, Birmingham University, England.

Isothermal Transformation of Austenite Under Externally Applied Tensile Stress, by S. Bhattacharyya and G. L. Kehl, Columbia University.

Thursday, Nov. 4

9:30 a. m.—Ballroom

STAINLESS

PRESIDING: D. J. Carney
United States Steel Corp.
and Peter Payson
Crucible Steel Co. of America

Effect of Cold Work and Recrystallization on the Formation of the Sigma Phase in Highly Stable Austenitic Stainless Steels, by A. J. Lena and W. E. Curry, Allegheny Ludlum Steel Corp.

Laves and Chi Phases in a Modified 12Cr Stainless Alloy, by F. L. VerSnyder and H. J. Beattie, Jr., General Electric Co.

Austenitic Chromium - Manganese-Nickel Steels Containing Nitrogen, by R. Franks, W. O. Binder and J. Thompson, Electro Metallurgical Co.

Effect of Deformation on the Martensitic Transformation in Austenitic Stainless Steels, by H. C. Fiedler, General Electric Co., and B. L. Averbach and Morris Cohen, Massachusetts Institute of Technology.

9:30 a. m.—Red Lacquer Room

HEAT TREATMENT

PRESIDING: G. V. Smith
United States Steel Corp.
and J. W. Spretnak
Ohio State University

Role of Water Vapor and Ammonia in Case Hardening Atmospheres, by P. A. Clarkin and M. B. Bever, Massachusetts Institute of Technology.

Effect of Heat Treatment Upon Microstructures, Microconstituents and Hardness of a Wrought Cobalt-Base Alloy, by J. W. Weeton and R. A. Signorelli, Lewis Flight Propulsion Laboratory, National Advisory Committee for Aeronautics.

Secondary Graphitization of Quenched and Tempered Ductile Cast Iron, by J. C. Danko and J. F. Libsch, Lehigh University.

Method for Determining the Continuous Cooling Transformations in Steel, by R. D. Chapman and W. E. Jominy, Chrysler Corp.

2:00 p. m.—Red Lacquer Room

HIGH TEMPERATURE

PRESIDING: W. O. Binder
Electro Metallurgical Co.
and W. D. Manley
Oak Ridge National Laboratory

Elevated Temperature Properties of Ductile Cast Iron, by C. R. Wilks, N. A. Matthews and R. Wayne Kraft, Jr., American Brake Shoe Co.

Effect of Cold Work on the High-Temperature Creep Properties of Dilute Aluminum Alloys, by R. E. Frenkel, Oleg D. Sherby and John E. Dorn, University of California.

Creep-Tempering Relationships in Hardened 4.5% Chromium Steels, by E. C. Roberts, Montana School of Mines, and N. J. Grant and Morris Cohen, Massachusetts Institute of Technology.

Strength of Wrought Zirconium-Base Binary Alloys at 1800 to 2200°F., by H. A. Saller, J. T. Stacy and S. W. Porembka, Battelle Memorial Institute.

Laboratory Instruction in Process Metallurgy*

Monday, Nov. 1

9:30 a. m.—Palmer House

Development of Laboratory Experiments for the Unit Process Approach to Extractive Metallurgy, by R. Schuhmann, Jr., Purdue University.

Role of Metallurgical and Thermodynamic Problems in the Metallurgical Engineering Laboratory, by C. S. Samis, University of British Columbia.

Unit Process Experiments in Fluid Flow, Combustion and Heat Transfer for Metallurgical Engineering Students, by W. O. Philbrook, Carnegie Institute of Technology.

Special Problems for Experiments in Process Metallurgy Laboratory, by A. W. Schlechten, Missouri School of Mines.

Role of Electrochemical Experiments in Process Metallurgy Instruction, by Herbert H. Kellogg, Columbia University.

**Conducted by A.S.M. Advistory Committee on Metallurgical Education.*

Eastern New York Hears R.P.I. Students Discussing Theses

Four metallurgical engineering seniors from Rensselaer Polytechnic Institute spoke briefly on the aims and progress of their respective thesis topics at the Student Night Meeting at Eastern New York.

"The Value of Lanthanum and Other Rare Earths as a Deoxidizer for Magnesium" was discussed by Matthew J. Donachie, Jr.

Though hexagonal metals have less plasticity and toughness than cubic structures, they still have a fair degree of plasticity. Magnesium, however, is lacking in this plasticity and toughness to a degree not evidenced by such hexagonal metals as zinc, cadmium, etc. This may be due to the dimensions of the structure, or it may be due to a grain boundary or interdendritic network of submicroscopic oxide films. By removing this film, the plasticity and toughness of magnesium may be improved.

Lanthanum and other rare earths are stronger oxide formers than magnesium. Evaluation of properties indicating an increase in formability may indicate deoxidation.

Robert D. Lupi discussed the "Isothermal Decomposition of Retained Austenite in the High-Pressure Erosion of Gun Barrel Steel".

In gun barrel steels, the tremendously high pressures and temperatures encountered from the gases during firing produce a chemically altered structure composed of a thin layer of retained austenite. This unique feature is believed to be caused by the diffusion of carbon and nitrogen into the surface of the steel to produce a thin layer of high-alloy content, resulting in a depressed Ms temperature and retained austenite.

This layered structure may be artificially produced by using an Enfield vent plug apparatus and the isothermal decomposition kinetics studied by subsequent tempering of the steel at various constant temperatures. A high-angle goniometer spectrometer can be used to determine the relative amount of the retained austenite present. An isothermal transformation diagram can be constructed for the decomposition of this retained austenite.

Results already obtained show that the time for decomposition of the retained austenite at 1200° F. is approximately 3 min., thus denoting that the retained austenite is extremely unstable. The transformation at 1200° F. for a similar steel, not exposed to this high-pressure erosion, is in the order of 3 hr.

This chemical alteration of the steel causes three distinct layers to form. The first two are called the outer white layers and are made up of complex carbides and nitrides. The third is the retained austenite layer. The total thickness of the three layers is of the order of 20,000 Angstrom units.

George Ansell's talk was concerned with the "Preparation of Specimens of Extruded Aluminum Powder for Optical and Electron Microscopic Examination".

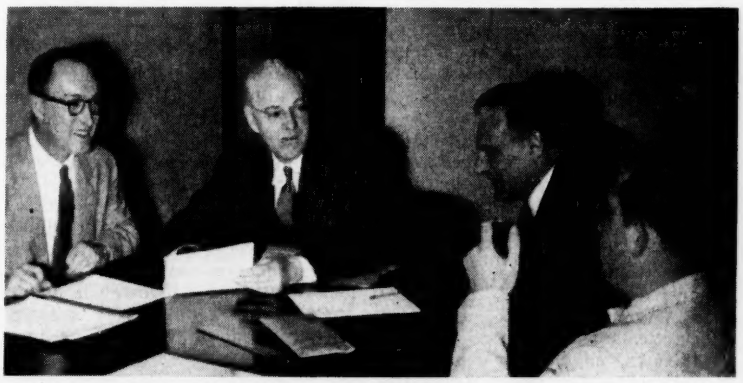
The preliminary step in this procedure was the preparation of a surface which permitted high-resolution optical examination. This surface must also be suitable for replication. A replication technique was developed which provided high resolution and reproducibility suitable for studying aluminum powder compacts.

Several optical photomicrographs of the structure were shown and their structural features discussed.

"A Stereoscopic Microradiographic Examination of Copper-Bismuth Specimens Made by Sintering in the Presence of a Liquid Phase" was discussed by Stanley M. Silverstein.

Cannon and Lenel, in their study of the liquid phase sintering of iron-copper and copper-bismuth alloys, were unable to obtain the predicted theoretical density. They postulated that a rigid skeleton structure was formed in these alloys during liquid-phase sintering. An attempt was made to see the rigid three-dimensional skeleton structure by stereo - microradiography using a G.E. X-ray microscope. Two microradiographs were taken of the same area of the specimen with a slight translation of the specimen by means of a vernier device. These were then viewed in a stereoscope in an attempt to see the rigid skeleton structure.—**Reported by John M. Gerken for Eastern New York.**

Plan Worcester's Educational Program



Members of the Educational Committee of the Worcester Chapter Are Shown Above Talking Over Plans for the 1954-55 Season. From left: Joseph C. Danec, Norton, Behr-Manning Overseas, Inc., program chairman; W. B. Dennen, director, Worcester Boys' Trade High School; H. K. Vickery, Norton Co.; and Harold J. Elmendorf, American Steel & Wire Division, U. S. Steel Corp., past chairman. (Reported by C. W. Russell for Worcester)

Announce 1955 Program For Science Teachers

Elementary and secondary science teachers are again encouraged to report their "best new ideas of the year". The Future Scientists of America Foundation of the National Science Teachers Association has announced the 1955 Program of Recognition Awards for Science Teachers. This program, now in its fourth year, is sponsored by the American Society for Metals and is a cooperative attempt to recognize science teachers who develop good ideas and share them with other teachers.

The winning teachers will be invited to receive their awards at the banquet meeting of the annual convention of the N.S.T.A. to be held in Cincinnati in March 1955.

Complete information may be obtained by writing: Future Scientists of America Foundation, 1201 16th St., N.W., Washington 6, D. C.

New Names Added to Quarter-Century Club

The following members of the New Jersey Chapter will receive honorary certificates commemorating 25 years' consecutive membership in the Society at the first meeting of the season.

Roger S. Brown, Henry J. Chapin, Granger Davenport, I. Erdman, J. E. Fitzsimons, A. C. C. Hansen, E. D. King, Thomas C. Malcolm, George McAusland and H. N. Padowicz, and Ackerlind Steel Co., Inc., Faitoute Iron & Steel Co., Public Service Electric & Gas Co., and Singer Manufacturing Co.—sustaining memberships.

Metallurgical News and Developments

Devoted to News in the Metals Field of Special Interest to Students and Others

A Department of *Metals Review*, published by the
American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio

New Detergent — A detergent that dissolves rapidly in hot or cold water, is harmless to hands and safe for both natural and synthetic fibers, has been announced by Kelite Products, Inc., Los Angeles.

Deflatable Container—U. S. Rubber has introduced a deflatable container for chemicals or powdered materials which can be used more than once and deflates into a small bundle when empty.

Carbide Cutting Metal—Firth Sterling, Inc., has developed a carbide cutting metal that uses a titanium rather than tungsten base. Nickel is used instead of cobalt as a binding material.

Building Blocks—Building blocks of shale aggregate that use adhesive instead of sand-cement mortar have been developed by the University of Tennessee Agricultural Experiment Station in Knoxville.

To Increase Staff—More than 1000 young graduates with electronic or aeronautical backgrounds will be added to the engineering department at Convair in San Diego within the next year.

Reading Time — Engineers average 4½ hr. reading time per day, according to a survey of 200 engineers in eight large Cleveland companies conducted by Case Institute of Technology. Time breaks down into 3 hr. on-the-job reading, 30 min. professional and 1 hr. recreational.

Tin Alloys—Work continues to develop tin alloys, both here and abroad, and so far indicates considerable promise for the extension of the product's application. One example: an electroplating alloy containing 75% tin and 25% zinc.

Hardsurfacing—Lockrey Co., Southhampton, N. Y., has announced a metal cladding product called Tungstide which can be applied by anyone to any surface at room temperature. It is said to impart a hardness and abrasion resistance almost equal to metallic tungsten and to be self lubricating as well.

Chemical Milling—A new method of chemical milling developed by North American Aviation, Inc., removes unwanted metal from complex parts without the use of machinery. Metal to be removed is left exposed and the rest of the part is masked with a special coating, after which the entire part is submerged in an etching solution.

Production Aid—Ford is now using a laminated mahogany board impregnated with synthetic resins for making die models and patterns for steel production dies. It replaces plain mahogany board, cuts down swelling, shrinkage and moisture absorption.

Pipe Plant—Mexico's first steel pipe plant, built and financed by Italian capital, will turn out 50,000 tons of seamless steel pipe yearly, enough to supply the needs of Mexico's oil industry.

Home Study—More than two million students are currently enrolled in correspondence courses of high-caliber institutions. Industry is finding home study a valuable way to secure advance training for workers in a variety of subjects.

Eclipse to Build—Eclipse Fuel Engineering Co., Rockford, Ill., has announced plans for a plant in Toronto, Ont., for its subsidiary, Eclipse Fuel Engineering Co. of Canda Ltd.

More Titanium — Titanium sponge production capacity will be increased by 1800 tons a year after completion of an addition to Dow Chemical's Midland, Mich., plant.

TO A.S.M. Members: Many of you are looking forward with pleasure to more details about the Technical Societies Congress in Europe from June 1-19, 1955. If you wish to be immediately informed on additional plans as they develop for the technical program and the planned visits, then send your name to A.S.M. headquarters and request to be placed on the mailing list to receive information about "A.S.M. to Europe in '55".

Wind Tunnel — Fabrication of three sections of a huge new wind tunnel is progressing at U. S. Steel's American Bridge Division's Ambridge, Pa., plant. The tunnel will be used for testing aircraft and missile engines at supersonic air speeds by the N.A.C.A. at the Lewis Flight Propulsion Lab in Cleveland.

Celebration—The Motch & Merryweather Machinery Co., Cleveland, founded in 1904, will celebrate its 50th anniversary in September. The company, which has grown from one office with four employees, now has six divisions and over 500 employees.

Kaiser Expands—Expansion of aluminum sheet rolling and finishing facilities at the Trentwood Works of the Kaiser Aluminum & Chemical Corp. will include two rolling mills, a 3000-ft. per min. cold rolling mill designed to produce light-gage sheet and a mill to produce wide embossed, or patterned, sheet.

A New Laboratory—for surface technology research has been opened in the Research Division of New York University's College of Engineering. The new lab is expected to facilitate present and future research programs for industrial and governmental sponsors.

GAMMA Radiography—The GAMMA Corp., Mansfield, Mass., has been organized to market equipment and offer services in the field of gamma radiography. The company offers a line of six basic instruments utilizing both Cobalt 60 and Iridium 192, as well as custom equipment for special installations, protection instruments and services.

Pistol-Shape Torch—A U. S. jet tanker transport that uses propane gas for soldering, burning and other jobs has been developed by Velocity-Power Tool Co., Pittsburgh. The torch's trigger enables the user to get up to 50% more time from a tank of gas.

Aluminum Joining—Horizons, Inc. has announced the development of a more economical and effective means of aluminum joining which gives indications that new fields for aluminum in home and industrial applications are nearer reality.

Discusses Cemented Carbides at Carolinas

Speaker: S. A. Oviatt
Kennametal Inc.

Use of carbide tools has saved 65% of the man-hours once expended in metal cutting, S. Allen Oviatt, manager of sales engineering, Kentanium Products, Kennametal Inc., told the Carolinas Chapter in a talk on "Cemented Carbides". Carbide tools have already made the jet age possible. No other known metal is hard enough to cut the so-called superalloys at production line speeds.

Mr. Oviatt told the story of tungsten carbide from Moissan's discovery through his company's development of improved fabrication methods and improved carbides containing titanium and tantalum.

Methods of producing Kentanium, a new heat resistant titanium carbide alloy, start with refining of the ores to high purity to make the carbides, which are then ball milled to a fine powder. The appropriate carbides are then blended with a binder such as cobalt, nickel, molybdenum or aluminum, and subjected to an explosive process which gives uniform compression on the order of 50,000 psi. The compacted slug, which is of a chalk-like consistency, is presintered, shaped by diamond wheel and sintered at 2500°F. in a vacuum furnace. Shrinkage is uniform so little or no machining is needed.

Specific examples were cited to show how the use of carbide mining drills has vastly reduced the cost of producing low-grade iron ore, coal and oil. Experiments on the material for jet engine blades show that it will resist temperatures above 2000° F. Today's jet engines operate at about 1500° F., and if this operating temperature could be raised the engine power would be greatly increased.

Other properties of tungsten-titanium carbide are a higher tensile strength at elevated temperatures than most of the refractory alloys, low density, high hardness and wear resistance. Young's modulus of elasticity approaches that of cemented tungsten carbide and is about double that of ferrous alloys, resulting in low distortion under load.

The speaker cited many other valuable applications in addition to jet engine parts and drill bits. Carbide guide inserts in steel rod mills wear from 60 to 200 times better than other materials. Carbide molds will squeeze out camera lenses so perfect that they do not have to be ground. A few of numerous other applications are pressure vessels, forging dies, bearings, bushings, tools for hot flash trimming, ball and valve seats in deep wells and thermostat cores.

Following his talk, Mr. Oviatt showed a film of a new jet plane that could not have been produced without cemented carbide parts.—**Reported by J. J. Hairston for the Carolinas Chapter.**

Inland Empire Chairman Receives Gavel

G. S. Fergin (Right), Retiring Chairman of the Inland Empire Chapter, Presents the Gavel and Chapter Bell to F. M. Krill, Incoming Chairman

THIRTY YEARS AGO

According to the Secretary's report of 1923, the staff of the national office consisted of the editor of the *Transactions* (then and now RAY T. BAYLESS), a bookkeeper, two stenographers and a membership file clerk (and of course, BILL himself). From this nucleus has grown the present headquarters staff of 51.

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The Chapter Membership and Attendance Contest for the year 1923 closed with Tri-City Chapter capturing first prize of $200. South Bend (now Notre Dame), came in second for a $150 prize, New Haven third, for $100, and Cincinnati fourth for a $50 prize.

—30—

FRANCIS F. LUCAS's famed pioneering work on high-power photomicrography is described for the first time in the November 1923 issue of the *Transactions*. The author points out that "It is more or less an accepted idea that photomicrographs in excess of 1500 diameters magnification are of little or no value. Exception is taken to this point of view . . ."

—30—

One of the pioneer chapters in sponsoring extensive night school courses was Tri-City, which opened a course at the Rock Island Manual Arts High School that met every Wednesday for a period of 20 weeks studying the subject of "Steel and Its Heat Treatment".

—30—

An "Item of Interest" in the November 1923 issue states that "JOHN A. MATHEWS (now deceased), an honorary member of this Society, has resigned as president of the Crucible Steel Co. of America . . . to devote his entire time to work in the metallurgical field."

Annual Golf Stag Party Held by Canton-Massillon

The annual golf stag of the Canton-Massillon Chapter was held at the Shady Hollow Country Club. Approximately 300 members and guests enjoyed an afternoon of golf and refreshments climaxed by a steak dinner and awarding of numerous golf and door prizes.

Highlight of the evening was the presentation of a past-chairman's certificate to D. J. Girardi, Timken Roller Bearing Co., by Frank J. Welchner, Canton Drop Forging and Manufacturing Co., newly elected chairman, and the welcoming of the other new officers for the 1954-55 season.—**Reported by G. P. Michalos for Canton-Massillon Chapter.**

Science Fair Gift From Inland Empire

F. M. Krill (Left), Inland Empire Chairman, and F. R. Morral (Right), Secretary of the Inland Empire Science Fair Association, Watch as M. F. Stavish, Chairman in Charge of Student Affairs, Presents a Check for $100 to A. H. Wegner (Second From Left), of the Washington Water Power Co., Who Is President of the Inland Empire Science Fair Association

The Inland Empire Chapter has started the financial campaign of the Inland Empire Science Fair Association by presenting a check for $100 to the president of the latter, A. H. Wegner, of the Washington Water Power Co. Members of the Inland Empire Chapter have actively encouraged, supported and helped with Science Fairs in the region, and these activities have developed into the Inland Empire Science Fair, one of 50 held last year in various parts of the country. The Inland Empire Science Fair ranked in the first ten for the number of students entering projects: 286 students from 37 high schools, 135 from junior high and grade schools provided more than 350 entries. Persons visiting the Fair exhibits had little doubt but that the stimulation given would go far towards assisting in the development of engineers, technicians and better citizens for tomorrow. Last year the Junior Science Fair was held separately, although simultaneously, with the Science Fair proper, but next year the two will be run together. The purpose of the Science Fair is to stimulate student interest in science, to provide encouragement to those seeking a career in science and to make for better citizenship.

Members of the American Society for Metals who helped as judges or speakers in last year's Inland Empire Science Fair were: G. S. Fergin, P. R. Sperry and Helen Goerig, Kaiser Aluminum & Chemical Corp.; E. A. Sprow, Opportunity Engineering; D. Bennett, Rainway Irrigation; and S. L. Channon, M. F. Stavish, D. D. Dewar, J. W. Murphy and F. R. Morral, Kaiser Aluminum and Chemical Corp.

F. R. Morral is secretary of the local Science Fair Association.

IMPORTANT MEETINGS *for October*

Oct. 3-7 — Electrochemical Society. 106th Annual Meeting. Statler Hotel, Boston. (H. B. Linford, Secretary, E. S., 235 West 102nd St., New York 25, N. Y.)

Oct. 7-8—National Foundry Association. Annual Meeting. Chicago. (L. E. Roark, Executive Vice-President, N.F.A., 53 West Jackson Blvd. Chicago 4, Ill.)

Oct. 11-15 — American Institute of Electrical Engineers. Fall General Meeting. Morrison Hotel, Chicago. (H. H. Henline, Secretary, A.I.E.E., 33 West 39th St., New York 18, N. Y.)

Oct. 18-19 — American Society of Lubrication Engineers. Joint Lubrication Conference with the American Society of Mechanical Engineers. Lord Baltimore Hotel, Baltimore, Md. (W. F. Leonard, Secretary-Treasurer, A.S.L.E., 84 East Randolph St., Chicago 1, Ill.)

Oct. 21—The Aluminum Association. Autumn Meeting. New York City. (Donald M. White, Secretary, A.A., 420 Lexington Ave., New York 17, N. Y.)

Oct. 29-31—Metal Treating Institute. Annual Meeting. Sheraton Hotel, Chicago. (C. E. Herington, Executive Secretary, M.T.I., 271 North Ave., New Rochelle, N. Y.)

Develops Al Designations

The Aluminum Association has developed an Alloy Designation System for Wrought Aluminum, to become effective Oct. 1, 1954. The designations and explanation of the new system will appear as a data sheet in the September issue of *Metal Progress*. Copies of the system may also be obtained by writing to the Aluminum Association, 420 Lexington Ave., New York 17, N. Y.

Heat Treating Course Presented by Carolinas

The Carolinas Chapter first educational series, consisting of eight 1-hr. lectures based on Grossmann's "Principles of Heat Treatment", attracted an enrollmen of 110 students when presented at Cawtawba College in Salisbury, N. C., and 46 students when repeated in Sanford, in eastern North Carolina.

The lectures were given by Albert R. Fairchild and Moss V. Davis, metallurgists at the Western Electric Co.'s North Carolina Works. The series was illustrated with appropriate slides and at the conclusion of both of the series, a recent color film on steelmaking was shown. Mr. Fairchild, then Chapter chairman, and Dr. Davis, membership chairman, traveled over 1100 miles in conducting the two series of educational courses.—**Reported by J. J. Hairston for the Carolinas Chapter.**

Powder Metallurgy Meeting

The Iron and Steel Institute, in association with the Institute of Metals, is arranging a Symposium on Powder Metallurgy, to be held in London on Dec. 1 and 2, 1954. Papers will cover both ferrous and nonferrous aspects of powder metallurgy, and a small exhibit of powder metallurgy components is being prepared.

Members of the American Society for Metals have been invited to take part in the proceedings. Further information may be obtained by writing: K. Headlam-Morley, Secretary, Iron and Steel Institute, 4 Grosvenor Gardens, London S. W. 1, England.

New Plant Opens

Salkover Metal Processing of Illinois, Inc., has moved into its new plant in Franklin Park, Ill. The plant was designed for Salkover's specialized processes and is an outstanding example of modern industrial construction for maximum efficiency.

Texas Elects

Arthur R. Oakley, Jr., Newly Elected Chairman of the Texas Chapter, Is Shown Receiving the Gavel and Charter from Outgoing Chairman, W. M. Crook. (Photo by Lee Dolan)

1954-55 Officers of Tulsa Chapter Meet

Recently Elected Officers of the Tulsa Chapter Are Shown During the Election Night Meeting. They are, from left: Paul Ogden, Phillips Petroleum Co., Bartlesville vice-chairman; George Sykora, Well Surveys, Inc., chairman; Jack T. Teed, Brown Instrument Div., publicity chairman; T. N. Duncan, Tulsa Winch Division, Vickers, Inc., retiring chairman; R. J. Cottingim, Douglas Aircraft Co., Inc., vice-chairman; L. Smith, Oklahoma Steel Castings Co., yearbook editor; and R. E. Miller, Greb X-Ray Co., secretary-treasurer

ASMers Open Plant

Will J. Kollas and E. G. Drew, both members of the A.S.M., have announced the opening of their company, Western Fabricators, Inc., in Portland, Ore. They will specialize in sheet metal work of all types.

Latrobe Warehouse

Latrobe Steel Co. has announced the opening of its newest and largest warehouse in Independence, Ohio, close to Cleveland.

The warehouse will be devoted exclusively to tool and die steels.

Springfield Chapter Elects Officers

Recently Elected Officers of the Springfield Chapter for the 1954-55 Season Include, From Left: Donald R. Barber, Secretary-Treasurer; F. D. Looney, Assistant Secretary-Treasurer; L. Brewster Howard, Vice-Chairman; Past-Chairman C. J. Duggan; and Ridgway A. Cook, Chairman

OBITUARIES

F. LLOYD WOODSIDE, president of the Park Chemical Co., and brother of William P., one of the founders of A.S.M., died in Detroit recently at the age of 58.

LUCIEN I. YEOMANS, president of Lucien I. Yeomans, Inc., industrial engineers in Chicago, died in August. Mr. Yeomans was the author of the books "Shell Making Machinery" and "Shell Processing", which he wrote for the U. S. Army Ordnance Department in 1940.

Pool Facilities

Salem-Brosius, Inc., manufacturer of heating and heat treating furnaces and special machinery, and Phillips Corp., mine and mill equipment manufacturers, are pooling their production facilities but will continue to maintain completely their separate corporate identities. Salem will lease space in Phillips' plant in Carnegie to carry on manufacturing for both companies.

is sponsor, through the National Science Teachers' Association, of the Annual Science Achievement Award for students in junior and senior high schools, to create a student interest in science and the advantages and desirabilities of engineering as a career. Value of awards, $5000.

CHAPTER MEETING CALENDAR

CHAPTER	DATE	PLACE	SPEAKER	SUBJECT
Baltimore	Oct. 18	Engineers Club	J. B. Austin	Magnification in Time
Birmingham	Oct. 5		R. J. Raudebaugh	Survey of Metallurgical Developments
Boston	Oct. 1	Smith House	L. D. Jaffee	Properties of Alloy Steels
Buffalo	Oct. 14			Plant Visit
Calumet	Oct. 12	Phil Smidt's	Ben Kaul	Cold Extrusion of Steel
Canton Massillon	Oct. 5	Mergus Restaurant	R. A. Witschey	Refractories
Carolinas	Oct. 21	Charlotte, N. C.	T. F. McCormick	Extrusion of Metals
Cedar Rapids	Oct. 12	Hotel Roosevelt	E. L. Fay	Quality Control in Industry
Chicago	Oct. 11	Furniture Mart	G. A. Roberts	Toolsteel—Developments and Applications
Cincinnati	Oct. 14		W. T. Baird	Drawing and Forming of Steel Stamping
Cleveland	Oct. 4	Hollenden Hotel	John Shaw	Wrought Products by Powder Metallurgy
Dayton	Oct. 13	Engineers Club	J. D. Graham	Fatigue of Metals
Indianapolis	Oct. 18	McClarney's Restaurant	E. F. Weller, Jr.	ABC's of Ultrasonic Inspection
Jacksonville	Oct. 11		F. LaQue	Combatting Corrosion
Kansas City	Oct. 20	Milleman's	J. F. Nelson	Titanium Forging
Los Angeles	Oct. 28	Rodger Young Auditorium	H. B. Osborn, Jr.	Induction Heating
Louisville	Oct. 5		A. H. Pickford	Application of Experimental Stress Analysis to Machine Design
Manitoba	Oct. 14	Marlborough	D. F. Cornish	
Milwaukee	Oct. 12	City Club	G. A. Roberts	National Officers Night
Minnesota	Oct. 12	Covered Wagon	Panel	Shell Molding Process
	Oct. 21	Continental Machine, Inc.		Plant Visit
Montreal	Oct. 4		A. C. Harris	Selective Hardening in Modern Heat Treating
Muncie	Oct. 12	Anderson, Ind.	John Welchner	Carburizing
New Haven	Oct. 21	Waverly Inn, Cheshire	B. E. McArthur	60-Cycle Induction Heating of Metals for Forging
New Jersey	Oct. 18	Essex House	F. E. Dreves	Machining Cold Finished Steel
New Orleans	Oct. 6	Country Club	E. N. Case	Advances in Carburizing Baths
New York	Oct. 4		Frank Foote	Metallurgical Problems in Nuclear Power
Northeast Pennsylvania	Oct. 14	Irem Temple Country Club	J. B. Austin	National Officers Night
Northwestern Pennsylvania	Oct. 21	Oil City	Plant Visit	Oil City Bottle Works
Notre Dame	Oct. 13	Engineering Bldg.	T. J. Dolan	Fatigue Damage in Metals
Oak Ridge	Oct. 20	K. of C. Hall	David Turnbull	Formation of Crystal Nuclei in Liquid Metals
Ontario	Oct. 1	Royal York Hotel, Toronto	F W. Boulger	Metallurgical Aspects of Machinability
	Oct. 8	Royal Connaught Hotel, Hamilton	C. W. Winegard	Solidification of Solids
Oregon	Oct. 22	Congress Hotel	B. W. Gonser	Protective Metal Coatings
Ottawa Valley	Oct. 5	P. M. R. L.	H. W. Horner	Titanium—the New Metal
Peoria	Oct. 11	American Legion Bldg.		Nondestructive Testing
Philadelphia	Oct. 29	Engineers Club	H. O. Walp	Metallurgy of Bearing Steels
Philadelphia-Jr. Section	Oct. 11	Engineers Club	Jack Schwartz	Development of the Heat Treatment of Steel
Pittsburgh	Oct. 14	Fort Pitt Hotel	James P. Gill	7th Annual Andrew Carnegie Lecture
Rochester	Oct. 11	Howard Johnson's	O. E. Cullen	Heat Treating in Controlled Atmospheres
Rocky Mt. Denver	Oct. 15	Oxford Hotel	John Willard	New Problems of Aluminum
St. Louis	Oct. 14	Engineers Club	L. M. Foster	Applications of Radioactive Tracers in Metallurgy
Saginaw Valley	Oct. 12		Allen G. Gray	Metallurgical Progress
Springfield	Oct. 18	Springfield, Vt.		Alloy Steel Manufacture and Specialty Mill Practice
Syracuse	Oct. 5	Onondaga Hotel	E. E. Bishop	Art of Spark Testing
Texas	Oct.		G. B. Baumeister	New Horizons in Nondestructive Testing
Tri-City	Oct. 5	Rock Island Arsenal	John R. Willard	What's New in Aluminum
Utah	Oct. 28	Provo	Ross Thoresen	Industrial Relations
Washington	Oct. 11			Quench and Draw Party
Wichita	Oct. 19	McConnell Air Force Base		Visit
Worcester	Oct. 13	Hickory House	Walter Gulliksen	Metal Stampings and Stamping Procedures
York	Oct. 13	Waynesboro	J. H. Moore	Vacuum Techniques

A. S. M. Review of Current Metal Literature

An Annotated Survey of Engineering, Scientific and Industrial Journals and Books Here and Abroad Received During the Past Month

Prepared in the Library of Battelle Memorial Institute, Columbus, Ohio

Stewart J. Stockett, Technical Abstracter

Assisted by Fred Body, Mitchell Baker, Mildred Landon and Members of the Translation Group

A
General Metallurgical

200-A. Reclamation of Aluminium From Scrap. P. V. Deshmukh. *Central Electrochemical Research Institute, Karaikudi, Bulletin,* v. 1, Jan. 1954, p. 23-25.

Methods, fluxes, and furnaces. 12 ref. (A8, Al)

201-A. Steel on the Defensive. Competition From Aluminium. *Engineering,* v. 178, July 2, 1954, p. 10-11.

World production of aluminum; areas of competition with steel; relative prices and costs; future prospects. Tables. (A4, Al, ST)

202-A. Development in the Iron and Steel Industry in Great Britain During the Last Twenty-Five Years. T. P. Colclough. *Iron and Steel Institute, Journal,* v. 177, July 1954, p. 297-304.

Review of improvements in productivity and quality. Future prospects. Tables. (A4, D general, ST)

203-A. (German.) **Processing Hard-Zinc in the Zinc-Distillation Plant.** H. Kiessler. *Metall,* v. 8, nos. 13-14, July 1954, p. 544-545.

Recovery of zinc by melting and purification. Table. (A8, C22, Zn)

204-A. The Current Domestic Zinc Situation. Howard I. Young. *American Zinc Institute, Journal,* v. 32, 1954, p. 28-33.

Production and consumption statistics. Need for production curtailment in view of decreased consumption. (A4, Zn)

205-A. World Zinc Situation. Jean Vuillequez. *American Zinc Institute, Journal,* v. 32, 1954, p. 39-51.

Trends in production, prices and consumption. Graphs. (A4, Zn)

206-A. Use of Zinc in Brass Mills in 1954. C. C. Felton. *American Zinc Institute, Journal,* v. 32, 1954, p. 68-73.

Production statistics and outlook of various industries using zinc and brass products. Possibilities for future consumption trends. Table. (A4, Cu, Zn)

207-A. A Dictionary of Metallurgy. A. D. Merriman and J. S. Bowden. *Metal Treatment and Drop Forging,* v. 21, June 1954, p. 269-276; July 1954, p. 317-323.

From "metallurgical coke" to "needled steel". (To be continued.) (A10)

208-A. Air Power for Metalworking. I. Air Power Unlimited Serves Broad Industrial Field. Lester F. Spencer. **II. Engineering the Compressor Installation for Maximum Efficiency.** Carl F. Benner. *Tooling and Production,* v. 20, July 1954, p. 56-66, 68, 72-73.

Description of industrial air tools and other uses for compressed air. Planning, selecting and installing the compressed air plant. Tables, photographs. 7 ref. (To be continued.) (A5)

209-A. (Czech.) **What Are We Expecting From Plants Which Treat Nonferrous Metals.** Milos Spevak. *Hutnické Listy,* v. 9, no. 6, June 1954, p. 348-351.

World consumption and production trends in nonferrous metals. Comparison with trends in steel statistics. Graphs. (A4, EG-a)

210-A. Review of Literature on Health Hazards of Fluorine and Its Compounds in the Mining and Allied Industries. S. J. Davenport and G. G. Morgis. *U. S. Bureau of Mines, Information Circular* 7687, June 1954, 55 p.

Toxicity studies in production of aluminum and beryllium, in magnesium foundries and in other industries. Effects on plants and animals. Tables. 101 ref. (A7, Al, Be, Mg)

211-A. (Book.) **ASM Review of Metal Literature.** v. 10. Marjorie R. Hyslop, editor. 711 p. 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio. $15.00.

Annual compilation of abstracts from ASM *Metals Review.* Includes subject and author indexes. (A10)

212-A. (Book.) **ASTM Proceedings: Volume 53, 1953.** 1197 p. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. $12.00.

Testing ferrous and nonferrous metals, paints, sealants, and adhesives. Papers on metals have been previously abstracted. (A general)

213-A. (Book.) **Minerals for the Chemical and Allied Industries.** Sydney J. Johnstone. 692 p. 1954 John Wiley & Sons Inc., 440 Fourth Ave., New York 16, N. Y. $11.50.

Properties, source of supply, processing, and uses of metallic and nonmetallic minerals in various industries. Includes metallurgy of most nonferrous metals. (A general)

214-A. (Book) **Quin's Metal Handbook, 1953.** 40th Ed. 784 p. 1954. Metal Information Bureau Limited, London. 25/—.

Reference book on ores, metals, iron and steel, and scrap. Prices, production, consumption, exports, imports, brands, stocks, analyses, properties, uses, and weights. (A4)

The coding symbols at the end of the abstracts refer to the ASM-SLA Metallurgical Literature Classification. For details write to the American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

215-A. (Book.) **A Textbook of Metallurgy.** A. R. Bailey. 500 p. Macmillan & Co. Ltd. St. Martin's St., London, W.C.2., England. 30s.

Physical metallurgy and metal manufacture; melting, alloying, and casting practice; working and fabrication; testing and pyrometry. (A general)

216-A. (Book—German.) **(Development of Wheels for Trucks and Buses.) Aus der Entwicklung der Räder für Lastwagen und Omnibusse.** 176 p. 1952 Georg Fisher Aktiengesellschaft, Schaffhausen, Switzerland.

Electric arc furnaces, steel foundry, forging plant, and machine shops of Georg Fischer works. (A5, T21, ST)

217-A. (Book—German.) **(Hundred Years of Heraeus. Anniversary Volume Published on Occasion of the Centennial of the W. C. Heraeus GmbH Platinum-Melting Plant Hanau.) Des 100 Jährigen Jubiläums der Firma W. C. Heraeus GmbH. Platinschmelze Hanau.** K. Ruthhardt, compiler. 406 p. 1954. Gestaltung und Gesamtherstellung Brönners Druckerei, Inhaber Breidenstein, Frankfurt am Main, Germany.

Collection of 27 articles on precious metals, electric heating, quartz glass, and thin films. (A5, Pt)

B
Raw Materials and Ore Preparation

229-B. Flash Roasting. W. H. Coates. *Fertiliser Society, Proceedings,* no. 26, 1954, p. 23-48; disc., p. 49-54.

Various processes for instantaneous decomposition of pyrites and similar sulfidic ores. Photographs, tables, diagrams, graphs. (B15)

230-B. The Nature of Ironstone Sinter. E. Maud McBriar, W. Johnson, K. W. Andrews, and W. Davies. *Iron and Steel Institute, Journal,* v. 177, July 1954, p. 316-323 + 4 plates.

Description of ore sintering procedures; changes during sintering; constitution of the sinter. Tables, diagrams, micrographs, photograph. 13 ref. (B16, Fe)

231-B. Leaching of Uranium and Vanadium Ores on the Colorado Plateau. E. J. Duggan. *Mines Magazine,* v. 44, June 1954, p. 50, 84, 86, 88.

Acid and soda ash treatment of carnotite and roscoelite ores. (B14, U, V)

232-B. Facets of Electric-Energy Uses. John D. Sullivan. *Mines Magazine,* v. 44, July 1954, p. 17-21.

Uses of electrical energy in production of chemicals, metals, and other products. Present and future industrial trends. Growth potentials of electric and other industries. 26 ref.
(B general, C general, D general)

233-B. Ironmen in Quest of Fuel. Arthur C. Bining. *Steelways,* v. 10, Aug. 1954, p. 8-11.

Historical review of fuels for ironmaking. Includes use of anthracite early in the nineteenth century and efforts to use raw bituminous coal in 1950. Photographs, diagrams. (B18)

234-B. (German.) **Sampling Ferro-Alloys and Their Ores.** Hubert Wirtz. *Archiv für das Eisenhüttenwesen,* v. 25, nos. 5-6, May-June 1954, p. 225-230.

Specifications of sampling ferroalloy materials. Tables, diagrams. (B12, Fe)

235-B. (Norwegian.) **Techniques and Industrial Uses of Fluidizing.** F. C. Collin. *Teknisk Ukeblad,* v. 101, no. 25, June 24, 1954, p. 555-560.

Principles, advantages, and limitations of different methods applied to catalytic oil cracking, water gas generating, coal coking, lime burning, and roasting of sulfide iron ores. Diagrams. 27 ref. (B15, B18, Fe)

236-B. (Russian.) **Electrochemical Investigation of Processes on the Crystal Surface of Heavy Metal Sulfides.** A. N. Zhdanova. *Zhurnal Fizicheskoi Khimii,* v. 28, no. 5, May 1954, p. 806-809.

Processes occurring when minerals are in contact with water containing dissolved gases. Graphs. 8 ref. (B14)

237-B. (Russian.) **Reduction of Copper Oxides by Graphite.** E. P. Tatievskaia, G. I. Chufarov, and N. M. Stafeeva. *Zhurnal Fizicheskoi Khimii,* v. 28, no. 5, May 1954, p. 843-850.

Materials, apparatus, and method of investigation. Speed of reaction in vacuum and in presence of gaseous reaction products. Diagram, graphs. 19 ref. (B14, Cu)

238-B. (Slovenian.) **Iron Ores of Macedonia.** Ciril Rekar. *Rudarsko-Metalurski Zbornik,* 1954, no. 1, p. 27-52.

Analyses and tests to determine feasibility of commercial processing of ores. (B10, Fe)

239-B. (Serbo-Croatian.) **The Imotski Bauxite Region.** Rikard Marusic. *Rudarsko-Metalurski Zbornik,* 1954, no. 1, p. 53-76.

Geographical - geological survey and analyses of bauxite deposits in remote area. Transportation problem. Maps, tables, stratigraphic chart. 4 ref. (B10, Al, Fe)

240-B. (Slovenian.) **Thermal Studies on Istrian Bauxites in Connection With Theoretical and Technical Aspects of Bauxite Calcination in Alumina Plants.** Stojan Zalar. *Rudarsko-Metalurski Zbornik,* 1954, no. 1, p. 77-95.

Behavior of several aluminum hydrates. Static and differential thermal analyses. Technological significance of calcination for plants using Bayer's process. Calcination at various temperatures. Graphs, diagram. (B14, Al)

241-B. Reaction Between a Mercury Surface and Some Flotation Reagents: An Electrochemical Study. S. G. Salamy and J. C. Nixon. *Australian Journal of Chemistry,* v. 7, May 1954, p. 146-156.

Mechanisms involved in flotation reagent-mineral reactions. Graphs. 7 ref. (B14)

242-B. Crushing and Grinding Calculations. Fred C. Bond. *Canadian Mining and Metallurgical Bulletin,* v. 47, no. 507, July 1954, p. 466-472; disc., p. 472; *Canadian Institute of Mining and Metallurgy, Transactions,* v. 57, 1954, p. 286-292.

Theoretical relationship between particle size and work input. Relations between ball mill volume, charge and grinding media. Sample calculations. Tables, graphs. 9 ref. (B13)

243-B. The Hydrocyclone in Mineral Preparation. T. R. Naylor. *Mining Magazine,* v. 91, July 1954, p. 9-15.

Applications and scope of its use as a classifier and thickener. Photographs, graphs. 11 ref. (B14)

244-B. (German.) **Kinetics and Thermodynamics of Crushing Phenomena.** I. G. F. Hüttig, H. Sales and O. Staufenberger. *Monatshefte für Chemie,* v. 85, no. 3, June 1954, p. 588-596.

Experimental and theoretical treatment. Graph, tables. 15 ref. (B13)

245-B. (Russian.) **Mineralogy of Aluminum-Barium Slags.** V. V. Lapin. *Doklady Akademii Nauk SSSR,* v. 96, no. 5, June 11, 1954, p. 1037-1039 + 1 plate.

Chemical compositions and microstructures. Tables, micrographs. 3 ref. (B21, M27, U6, Al, Ba)

246-B. Progress Report on Development of Columbium in Arkansas for 1953. V. A. Nieberlein, M. M. Fine, W. A. Calhoun and E. W. Parsons. *U. S. Bureau of Mines, Report of Investigations* 5064, July 1954, 23 p.

Determination of reserves, methods for concentrating the minerals and extracting the metal. Tables, flowsheets. 32 ref. (B10, Cb)

247-B. Petroleum Sulfonate Flotation of Beryl. S. M. Runke. *U. S. Bureau of Mines, Report of Investigations* 5067, July 1954, 19 p.

Beryl satisfactorily floated with numerous petroleum sulfonate reagents under varied conditions. Tables. 9 ref. (B14, Be)

248-B. (German.) **The Migration of Slag Constituents Into Refractory Bricks.** Kamillo Konopicky. *Stahl und Eisen,* v. 74, no. 15, July 15, 1954, p. 943-947.

Study shows slagging resistance is related to temperature gradient, porosity, interfacial forces and fluxing materials. Graphs. 25 ref. (B21, B19)

C
Nonferrous Extraction and Refining

169-C. Prospects of Electrolytic Production of Magnesium Metal in South India. V. Aravamuthan. *Central Electrochemical Research Institute, Karaikudi, Bulletin,* v. 1, Jan. 1954, p. 19-22.

Review of electrolytic process. Local circumstances favoring production. Cost factors. 5 ref. (C23, Mg)

170-C. Some Techniques for Melting Reactive Metals. D. H. Polonis, R. G. Butters, and J. Gordon Parr. *Research,* v. 7, July 1954, p. 272-277.

Electric arc melting in a water-cooled copper hearth; melting a suspended rod by induction heating; levitation melting. Diagrams, photographs. 13 ref. (C21)

171-C. Purification of Germanium. George H. Morrison and Donald H. Baird. *Sylvania Technologist,* v. 7, July 1954, p. 70-75.

Chemical and physical methods. Normal-freezing, zone-melting and zone-leveling. Growth of single crystals. Graphs, diagrams, photograph, tables. 13 ref. (C5, N12, Ge)

172-C. (Italian.) **Present Trends in the Field of Lead Production.** Giovanni Rolandi. *Metallurgia italiana,* v. 46, no. 5, May 1954, p. 173-184.

Minerals; mineral mixtures; desulfurization; fusion; and refining. (C21, Pb)

173-C. Melting and Heating by Induction. J. C. Howard. *Metal Industry,* v. 85, July 9, 1954, p. 29-31.

Developments in electric furnace operation and design. Photographs. (C21, Al)

174-C. (French.) **Practical Use of Steel Regenerators in Metallurgical Furnaces.** J. Faure. *Métallurgie et la construction mécanique,* v. 86, no. 6, June 1954, p. 517 + 4 pages.

Special application of waste heat converters. Photographs, diagrams. 8 ref. (C21, D2, ST)

175-C. (French.) **Production and Uses of Germanium, Pure Silicon, Tantalum, Niobium and Zirconium.** Chevigny and Roy. *Métaux, Corrosion-Industries,* v. 29, no. 345, May 1954, p. 181-189.

Application to electronics. Table. 26 ref.
(C general, T1, Ge, Si, Ta, Nb, Zr)

176-C. (German.) **Electrothermal Remelting of Copper Electrodes.** Werner Schwartz. *Zeitschrift für Metallkunde,* v. 45, no. 6, June 1954, p. 322-324.

Construction and characteristics of arc and induction furnaces for melting and refining. Diagrams, tables. 13 ref. (C21, A8, Cu)

177-C. (Hungarian.) **Slag Problems of Silicon-Thermal Magnesium Reduction.** Andor Szulyovszky. *Kohaszati Lapok,* v. 9, no. 7, July 1954, p. 326-331.

Production of magnesium from dolomite by reduction with silicon. Silicate reactions. Tables, phase diagrams, graphs. 5 ref. (C26, Mg)

D
Ferrous Reduction and Refining

327-D. The Use of Manganese Sulphide to Improve the Hot Workability of Steel. Simon Feigenbaum. *Foote Prints,* v. 26, no. 1, 1954, p. 3-6.

Effects of sulfur additions on hot rolling behavior. Results of production heats. Photographs. (D2, F23, CN)

328-D. Foote "Rimex" Improves Quality of Deep Drawing Steels. Anthony C. Demos. *Foote Prints,* v. 26, no. 1, 1954, p. 7-10.

Advantages of use of rimming agent include low cost, improved rimming action, and absence of noxious fumes. Photographs, diagram. (D2, ST)

329-D. Regenerator Efficiency and Air Preheat in the Open Hearth. VII. B. M. Larsen. *Industrial Heating,* v. 21, July, 1954, p. 1350, 1352, 1354.

Design of an aspirating thermocouple for use in obtaining temperatures for calculating regenerator efficiency. Diagram. (D2, S16)

330-D. Electric Steel Production. II. Chromium in Electric Furnace Steel. D. D. Howat. *Iron & Steel,* v. 27, July 1954, p. 341-345.

Chromium-oxygen equilibrium re-

lations; distribution of chromium between metal and slag; refining of high-chromium steels. Tables. 34 ref. (D5, P12, Cr, AY)

331-D. The Formation and Decomposition of Fayalite ($2FeO \cdot SiO_2$). B. G. Baldwin. *Iron and Steel Institute, Journal,* v. 177, July 1954, p. 312-316.

Effect of particle size, time of heating, and temperature on formation from mixtures of ferrous oxide and silica. Effect of fayalite on the blast furnace process. Diagram. 4 ref. (D1, B22)

332-D. Steel Melting. ASM Committee on Melting. *Metal Progress,* v. 66, no. 1-A, July 15, 1954, p. 154-158.

Bessemer process, basic open-hearth and electric furnace, oxygen treatment, ingot and pouring practice, continuous casting, and vacuum and atmosphere melting. Diagrams, photograph. (D general, ST)

333-D. Oxygen Converter Steel. Another Step Closer to U. S. Debut. W. C. Rueckel and W. A. Vogt. *Steel,* v. 135, July 19, 1954, p. 110, 112, 114.

Review of use of oxygen in bessemer process. Oxygen requirements; heat balance. Advantages and disadvantages. Photograph, graphs, tables. (D3, CN)

334-D. Swedish Induction Stirring Process. *Times Review of Industry,* v. 8, new ser., July 1954, p. 111.

Description of equipment and its operation. Use in electric steelmaking. Photograph, diagrams. (D5)

335-D. (German.) **Lines of Development in Heat and Power Economy of the Iron and Steel Industry.** Ernst Krebs. *Stahl und Eisen,* v. 74, no. 13, June 17, 1954, p. 813-822.

Literature review on efficiency of power plants, gas generators, and heat consumption. Graphs, diagrams. 63 ref. (D general)

336-D. (Slovenian.) **Course of Deoxidation and Formation of Inclusions.** W. Koch. *Rudarsko-Metalurski Zbornik,* 1954, no. 1, p. 3-26.

Experiments on introducing deoxidizing agents in tubes inserted into the molten steel. Photographs, micrographs, graphs, tables, diagrams. 3 ref. (D2, ST)

337-D. Blast Furnace Design Problems. Fred E. Kling. *Blast Furnace and Steel Plant,* v. 42, July 1954, p. 778-786.

Design of furnaces and auxiliary equipment. Diagrams, graphs, tables. (To be continued.) (D1)

338-D. Coke Plant and Blast Furnace Expansion at Fontana. Clarence R. Lohrey. *Iron and Steel Engineer,* v. 31, July 1954, p. 67-69.

Increased production facilities and quality of products. Tables, graphs. (D1, B22, ST)

339-D. Trends in Blast Furnace Linings. Hobart M. Kraner. *Iron and Steel Engineer,* v. 31, July 1954, p. 79-81; disc., p. 82.

Increasing demands by blast furnace operator push ingenuity of ceramic engineer and manufacturer. Diagrams. 7 ref. (D1)

340-D. Cleaning of Open Hearth Checkers and Sewers During Operation. R. M. Jordan. *Iron and Steel Engineer,* v. 31, July 1954, p. 98-101; disc., p. 101-102.

Use of water and air to blow checker openings and installation of agitators to blow the sewers. Photographs, diagrams. (D2)

341-D. (English.) **Continuous Casting of Steel on an Industrial Scale.** *Aciers Fins & Spéciaux Francais,* 1954, no. 17, June, p. 60-63.

Plant operation, production and special tests. Photographs. (D9, ST)

342-D. (English.) **Usinor.** *Aciers Fins & Spéciaux Francais,* 1954, no. 17, June, p. 123-126.

Production of carbon and special steels by basic bessemer, openhearth and electric process by the Union Sidérurgique du Nord de la France. Photographs. (D3, D2, D5, CN, AY)

343-D. (Czech.) **Evaluation of Technical Data on Coking Plants and Blast Furnaces in the First Five-Year Plan.** Ladislav Sajch and Frantisek Väna. *Hutnické Listy,* v. 9, no. 6, June 1954, p. 321-327.

Czechoslovakian coke yield and quality, blast furnace charging practice; pig iron production statistics. Tables, graphs. (D1, B22, A4, CI)

344-D. (Czech.) **Treatment of Pig Iron After Tapping to Recover Vanadium.** F. Houdek and M. Oppelt. *Hutnické Listy,* v. 9, no. 6, June 1954, p. 327-333.

Development of process for recovering vanadium from slag. Photographs, tables, graphs. (D1, A8, CI, V)

345-D. (Czech.) **Experiences With Soviet Apparatuses Used for Steel-Melting Furnaces in the NHKG.** J. Stary. *Hutnické Listy,* v. 9, no. 6, June 1954, p. 333-341.

Temperature control equipment and its operation. Diagrams. (D8, S16, ST)

346-D. (Czech.) **Treatment of Stainless Steel Scrap by Melting in Basic Openhearth Furnace.** Antonin Danihelka. *Hutnické Listy,* v. 9, no. 6, June 1954, p. 341-348.

Study of three remelting processes for recovery of scrap elements. Best procedure was duplexing in open-hearth and electric furnaces. Diagrams, tables. (D7, A8, SS)

347-D. (German.) **Comparison of Various Forms of Openhearth Furnaces.** Reinhold Baake. *Metallurgie und Giessereitechnik,* v. 4, no. 5, May 1954, p. 222-223.

Comparison of East German and Russian furnaces. Diagrams. 1 ref. (D2)

348-D. Electric Ingot Steel. Old Process Solves Jet Age Problem. *Steel,* v. 135, Aug. 9, 1954, p. 106, 108.

Advantages of electric ingot process for production of superalloys. Process involves continuous melting and casting and progressive solidification. Photographs, diagrams. (D9, AY)

E

Foundry

469-E. Investment-Casting. *Aircraft Production,* v. 16, July 1954, p. 292-294.

Production of small, intricate parts. Technical and economic aspects. Photographs. (E15)

470-E. Risering of Nodular Iron. R. C. Shnay and S. L. Gertsman. *Canadian Metals,* v. 17, June 1954, p. 32, 34, 36-37.

Determination of maximum feeding distance using uncovered open risers. Photograph, charts. 4 ref. (E22, CI)

471-E. Shell Moulding Equipment. *Engineer,* v. 198, July 2, 1954, p. 13-14.

Description of machines for core making and blowing, and mold making and closing. Photographs. (E19, E21)

472-E. The Suppression of Dust. Prevention and Control in Foundries. *Engineering,* v. 178, July 9, 1954, p. 36-37.

Extract from "Dust Suppression in Foundries", W. B. Lawrie, presented at Summer Meeting of the Institution of Heating and Ventilating Engineers, London. Counting and sampling of particles; sources of dust; control systems; ventilation. Photographs. (E general A7)

473-E. Pinhole Porosity in Brass and Gunmetal Castings. N. B. Rutherford. *Foundry Trade Journal,* v. 97, July 1, 1954, p. 13-20.

Pinhole porosity was traced to a form of metal-mold reaction associated with the use of wheat flour as a mold dressing or sand addition. Photograph, diagrams, micrographs, tables. 2 ref. (E25, Cu)

474-E. New Casting Techniques—Precision Castings. L. M. Christensen. *Industrial Heating,* v. 21, July 1954, p. 1298 + 5 pages.

Review of permanent mold, die, and investment casting; shell molding. (E12, E13, E15, E16)

475-E. Design of Ferrous Castings. ASM Committee on Cast Metals. *Metal Progress,* v. 66, no. 1-A, July 15, 1954, p. 109-114.

Design principles and patterns for gray, white, malleable, and nodular cast iron and steel castings. Diagrams, photographs, tables, graph. 6 ref. (E17, CI)

476-E. Centrifugal Die Casting in Rubber Moulds. *Tin and Its Uses,* 1954, no. 30, p. 4-5.

Equipment, procedures, and applications. Photograph. (E13, Sn)

477-E. Olivine Fines for Foundry Use. William A. Snyder. *Trend in Engineering, (University of Washington),* v. 6, July 1954, p. 5-7, 32.

Properties and advantages of olivine molding sands. Table. 4 ref. (E18)

478-E. A Study of Reactions at Sand-Metal Interfaces. E. A. Rowe and R. T. Torgerson. *Trend in Engineering, (University of Washington),* v. 6, July 1954, p. 16-21, 30-32.

Changes in hardness of steel castings resulting from interfacial reactions. Structural changes which occur in the steel adjacent to the interface. Photographs, graphs, tables, X-ray diffraction pattern, micrograph. 6 ref. (E25, Q29, CI)

479-E. (French.) **Cupola Melting of Ferrous Materials and the Problem of Carbon in Cast Iron.** J. Pascal. *Métallurgie et la construction mécanique,* v. 86, no. 6, June 1954, p. 497 + 7 pages.

Variation of elements in first and second meltings. Melting of low-carbon and special irons. Tables, graphs, micrographs. 14 ref. (E10, CI)

480-E. (German.) **The Behavior of Molding Sand at High Temperatures.** P. Nicolas. *Giesserei,* v. 41, no. 13, June 24, 1954, p. 333-338.

Methods of determining heat resistance, gas evolution, susceptibility to checking, and thermal expansion. Effects of clay content, type of binder, moisture, and inclusions. Graphs, diagrams, table. (E18)

481-E. (German.) **Experiences in Cupola Operation.** Heinrich Schmidt. *Giesserei,* v. 41, no. 13, June 24, 1954, p. 346-347.

Proper operation and maintenance. Diagrams. (E10)

482-E. (German.) **Melting, Holding and Ladling Furnaces in the Light Metal Industry.** J. P. Rohn. *Metall,* v. 8, nos. 13-14, July 1954, p. 538-540.

Relative efficiency of various furnaces. Diagrams, photograph, tables. (E10, Al)

483-E. (Serbo-Croation.) **Calculating the Dimensions of the Casting System for Steel Casting.** Abduselam Sarajlic.

Rudarsko-Metalurski Zbornik, 1954, no. 1, p. 97-104.

Formulas for casting speeds. Dimensions and shapes of sprues. Graphs, diagrams, photograph. 1 ref. (E23, CI)

484-E. Modern Malleable Iron Production and Selling. Herbert F. Scobie. *American Foundryman*, v. 26, Aug. 1954, p. 32-37.

Plant modernization program provides balance between maximum quality control and production with a minimum investment. Photographs, plant layout, table. (E general, A5, CI)

485-E. Inspection and Salvage of Magnesium Castings. B. G. Harr. *American Foundryman*, v. 26, Aug. 1954, p. 39-42.

Visual examination and dimensional checking. Salvage methods including welding and peening. Impregnation of castings. Photographs. (E general, S14, A8, Mg)

486-E. Some Effects of Nitrogen in Cast Iron. II. J. W. Dawson, L. W. L. Smith and B. B. Bach. *American Foundryman*, v. 26, Aug. 1954, p. 43-49.

Treatment of molten iron with fluxed ferrocyanides, cyanamides or similar nitrogen-containing compounds. Effect of nitrogen on properties and structures of these treated irons. Photograph, micrographs, tables, graphs. 14 ref. (E25, CI)

487-E. How to Design an Exhaust System. W. W. Dodge. *American Foundryman*, v. 26, Aug. 1954, p. 50-55.

Step-by-step calculations for typical foundry exhaust system. Photographs, diagram, nomograph, tables. (E general, A5)

488-E. Foundry Facts. Standardization and Maintenance of Sand Testing Equipment. *American Foundryman*, v. 26, Aug. 1954, p. 67-68.

Care and use of balances, moisture indicators, sand rammers, permeability meters, and strength and deformation testers. (E18)

489-E. The Influence of Grain Size Distribution on Some Properties of Sand. J. H. Gittus. *British Cast Iron Research Association, Journal of Research and Development*, v. 5, June 1954, p. 318-330.

Establishes manner in which sand conducts heat from a cooling casting, pressure needed to cause penetration of sand molds by molten metals and the air permeability. Tables, graphs, diagrams. 24 ref. (E18)

490-E. Foundry Practice. VII. Closing and Pouring the Moulds. VIII. The Cast Metal. William H. Salmon and Eric N. Simons. *Edgar Allen News*, v. 33, July 1954, p. 157-158.

Includes table. (To be continued.) (E23)

491-E. Developments in Foundry Mechanization. R. J. Geitman. *Foundry*, v. 82, Aug. 1954, p. 70 + 10 pages.

Problems and steps to consider in formulating a materials handling system. Photographs, diagrams. (E general, A5)

492-E. Effect of Melting Frequency on Induction Melted Aluminum Alloys. A. Saia, S. Lipson and H. Rosenthal. *Foundry*, v. 82, Aug. 1954, p. 84 + 5 pages.

Compares properties of different alloys melted in gas-fired and electric induction furnaces. Photograph, micrographs, tables, graph. 3 ref. (E10, Q general, Al)

493-E. Floating Foundries. Jack E. Bolt and William H. Baer. *Foundry*, v. 82, Aug. 1954, p. 88-89.

U. S. Navy ships produce castings to meet maintenance, emergency and damage requirements. Photographs. (E general)

494-E. Southern Foundry Marks 65 Years of Progress. William G. Gude. *Foundry*, v. 82, Aug. 1954, p. 90 + 5 pages.

Progressive policies and modern production and marketing methods responsible for growth of Ross-Meehan Foundries, Chattanooga, Tenn. Photographs. (E general, A5)

495-E. Cupola Development. First Report of Sub-Committee T.S.43 of the Technical Council of the Institute of British Foundrymen. *Foundry Trade Journal*, v. 97, July 8, 1954, p. 47-51; July 15, 1954, p. 69-75.

Reviews British experience. Advantages and economic factors derived from water cooling the melting zone. Diagrams, tables, graphs. 17 ref. (E10, CI)

496-E. Measuring Machine Time Utilisation in the Diecasting Shop. *Mechanical World and Engineering Record*, v. 134, July 1954, p. 304-305.

System gives automatic record combined with operator's statement of reasons for change or irregularity. Photographs, table. (E13)

497-E. The "D" Process. H. W. Dietert. *Metal Industry*, v. 85, July 9, 1954, p. 23-25.

Further developments in precision casting. Diagrams. (E15)

498-E. Magnesium Parts Given Greater Protection by New Sealing Process. I. B. Herr. *Western Metals*, v. 12, July 1954, p. 61-63.

New resin formulation and impregnation method known as Magseal increases corrosion resistance of magnesium castings from 300 to 400%. Micrographs, photographs. (E25, Mg)

499-E. (English.) **Generalities on the Centrifugal Casting of Steel.** *Aciers Fins & Spéciaux Francais*, 1954, no. 17, June, p. 96-100.

Production and applications of tubes and hollow parts from special steels. Centrifuges used and applications. Photographs. (E14, ST)

500-E. (Swedish.) **Life of Bentonite-Bonded Molding Sands.** Olof Carlsson. *Gjuteriet*, v. 43, no. 11, Nov. 1953, p. 193-196.

Casting experiments with steel, gray iron and red brass in molding sands bonded with different types of bentonite. Photographs, graphs. 3 ref. (E18)

501-E. (Swedish.) **A Swing Table Mechanization.** T. Sundell. *Gjuteriet*, v. 43, no. 11, Nov. 1953, p. 198-199.

Swing tables to facilitate pouring of snap flask molds provide greater production, easier work, better air in the foundry and less risk of casualties. Diagram, photographs, tables. (E23)

502-E. (Swedish.) **Increase of Production in a Small Foundry.** E. Sabel. *Gjuteriet*, v. 43, no. 11, Nov. 1954, p. 200-201.

A 60% increase in production was obtained by casting after ordinary work hour, molding with cement sand for certain castings, molding out of doors and using the facilities of first-class laboratory. Photographs. (E general, CI)

503-E. The Investment Casting Process. *Precision Metal Molding*, v. 12, Aug. 1954, p. 39-41.

Description, advantages, applications and costs. Photographs. (E15)

504-E. Brass Permanent Mold Castings Cost 16% Less Than Sand Castings. H. D. Ward. *Precision Metal Molding*, v. 12, Aug. 1954, p. 48-49.

Savings and other advantages in molding a part for papermaking machine. Photographs, table, diagrams. (E12, Cu)

505-E. Factors That Affect Choice of the Proper Casting Method. Clark Sims. *Precision Metal Molding*, v. 12, Aug. 1954, p. 93-98.

Quality, quantity, space, time and human factors. Photograph. (E general)

506-E. Sealing Porous Castings. Wilson N. Pratt. *Tool Engineer*, v. 33, Aug, 1954, p. 70-72.

New types of impregnants and methods of impregnation in aircraft industry. Photographs. (E25, Al, Mg)

507-E. (German.) **The Solidification of Steel in Sand Molds With Special Consideration of the Use of External Iron Chills.** Hans Stein. *Giesserei*, v. 41, no. 15, July 22, 1954, p. 381-388.

Factors to be considered in complex castings and strength properties of steel castings and forged parts. Photographs, diagrams, graphs. 18 ref. (E25, Q23, CI)

508-E. (German.) **Inspection of Patterns.** Fr. Lamm. *Giesserei*, v.41, no. 15, July 22, 1954, p. 393-394.

Pointers on checking suitability of pattern designs to prevent defective castings. (E17)

509-E. (Hungarian.) **Problems of Power and Material of the Cupola Furnace.** Miklos Kiraly. *Ontöde*, v. 5, no. 7, July 1954, p. 145-157.

Problems arising in Hungary from necessity of economizing with raw materials, especially coke. Role of quantity of charge, size of ore lumps, blast and design of furnace. Diagrams, tables. 8 ref. (E10, CI)

510-E. (Brochure.) **Ideal Foundry in Pictures.** Her Majesty's Stationery Office, York House, Kingsway, London, England. 8s.6d.

Visual account, accompanied by brief running commentary, of those features of American foundry practice which most impressed European experts who visited the United States in 1952. (E general)

511-E. (Book.) **The Cupola and Its Operations.** 2nd Ed. 332 p. 1954. American Foundrymen's Society, 616 S. Michigan Ave., Chicago 5, Ill. $6.00.

Operations; equipment; materials; and principles related to operations. (E10)

F

Primary Mechanical Working

276-F. Fairless Works — Electric Equipment for Slabbing Mill and Blooming Mill. R. H. Wright and N. L. Kincaid. *Applications and Industry*, 1954, no. 13, p. 141-143; disc., p. 143-144.

Description of drives and circuits. Diagrams. (F23, ST)

277-F. Researches in Surface Friction in Cold Rolling. P. W. Whitton. *Australian Journal of Applied Science*, v. 5, June 1954, p. 155-177.

Mean values of the coefficient of surface friction between metal strip and smooth work rolls, both with and without lubrication. Diagrams, photographs, graphs, tables. 12 ref. (F23, Q9, CN, Cu)

278-F. The Influence of Soluble Oils on Surface Finish in the Hot Rolling of Aluminium and Its Alloys. H. A. Snow. *Sheet Metal Industries*, v. 31, no. 327, July 1954, p. 601-608.

Effects of wetting properties and emulsion stability. Photographs,

graphs. 5 ref. (F23, F1, Al)

279-F. Determination of Correct Wire Tensions. Erwin J. Saxl. *Wire and Wire Products,* v. 29, July 1954, p. 752-753.

Shows effect of tension in wire drawing, coating, or insulating. Provides a table of safe operating tensions for any particular operating condition. Photograph, table. (F28, Cu)

280-F. Marshall Richards Tube-Drawing Machinery. *Wire Industry,* v. 21, July 1954, p. 703, 707.

A versatile horizontal bull block. Photographs. (F26)

281-F. (German.) **Forging and Hot Pressing of Light Metals With Electron Metal Dies.** B. Preuss. *Metall,* v. 8, nos. 13-14, July 1954, p. 540-541.

Comparison of production costs with different dies. Diagrams, tables. (F22, Al)

282-F. (German.) **Spreading in Flat Rolling of Round Wire and Determination of Cross-Section Shapes.** Werner Lueg and Karl-Heinz Treptow. *Stahl und Eisen,* v. 74, no. 14, July 1, 1954, p. 881-888.

Effect of carbon content and pressure. Tables, graphs, micrographs, diagrams. 7 ref. (F28, ST)

283-F. (Russian.) **Distribution of Power in Roll Stand Mechanism With Unequal Peripheral Roll Speeds.** A. A. Nikitin. *Vestnik Mashinostroeniia,* v. 34, no. 6, June 1954, p. 18-23.

Theoretical treatment of torque distribution. Diagrams, tables. 2 ref. (F23)

284-F. (Russian.) **The Distribution of Torque in Rolling Mill Rolls.** A. I. Tselikov. *Vestnik Mashinostroeniia,* v. 34, no. 6, June 1954, p. 23-24.

Effects of unequal roll speeds and pressures. Diagrams. (F23)

285-F. Australian Developments in Drawn-Galvanised Rope Wires. F. W. Welshman and C. James. *Australasian Engineer,* 1954, May, p. 43-47.

Preparation and properties of galvanized wires for ropes. Effect of various methods of coating on properties of the wire. Tables, diagrams, micrographs, graphs. (F28, L16)

286-F. Surface Friction Investigations in Cold Rolling. P. W. Whitton. *Australasian Engineer,* 1954, May, p. 54-62.

Friction coefficients obtained by measurements of torque per roll, total roll separating force, back tension applied and forward slip of the rolled strip. Diagrams, photographs, tables, graphs. 9 ref. (F23, Q9, Al, CN, Cu)

287-F. Wire Straightening and Molding for Wire Spring Relays. A. J. Brunner, H. E. Cosson and R. W. Strickland. *Bell System Technical Journal,* v. 33, July 1954, p. 859-884.

Straightening of large quantities of small diameter wire and molding of a multiplicity of straightened wire inserts into phenolic resin blocks. Photographs, diagrams. (F29)

288-F. Aluminium Strip, Sheet and Plate Mill at Resolven. *Engineer,* v. 198, July 9, 1954, p. 46-49.

Buildings, equipment and plant layout. Operation of mill hot line. Photographs, flowsheet. (To be continued.) (F23, Al)

289-F. Some Factors Affecting the Quality of Extrusions. I. Christopher Smith and Norman Swindells. *Industrial Heating,* v. 21, July 1954, p. 1316 + 3 pages.

Effect of billet quality and preheating furnace variables on aluminum and copper extrusions. (To be continued.) (F24, Al, Cu)

290-F. Combination Bar and Rod Mill—Los Angeles Plant. C. C. Brandt and Phillip Scarola. *Iron and Steel Engineer,* v. 31, July 1954, p. 72-78.

Market conditions on West Coast have resulted in a demand for unusual flexibility. Photographs, tables, graphs, diagrams. (F23, F27, ST)

291-F. Electric Systems for Main Drives. W. E. Miller. *Iron and Steel Engineer,* v. 31, July 1954, p. 83-94; disc., p. 94-97.

Advancements in the engineering of electrical mill equipment increases production and gives better control and quality. Photographs, diagrams, graphs, tables. (F23)

292-F. Trends in Recent Cold Mill Installations. R. E. Noble. *Iron and Steel Engineer,* v. 31, July 1954, p. 105-116.

Advancement of operation to meet demands for speed and power. Graph, photographs, diagrams. (F23)

293-F. Extruded Pistons. *Modern Metals,* v. 10, July 1954, p. 82.

Stronger, lighter, cheaper aluminum pistons. Photograph. (F24, T7, Al)

294-F. The Rolling of Metals and Alloys. II. Principles Underlying the Design, Use and Reproduction of Roll Cambers. E. C. Larke. *Sheet Metal Industries,* v. 31, no. 327, July 1954, p. 611-618, 620.

Importance of roll cambering on gage uniformity across width of strips, determination of shape and amount of cambers for cold rolling. Diagrams, graphs, photographs, tables. 13 ref. (To be continued.) (F23)

295-F. The Canton Forge Plant of the Ford Motor Company. H. E. Trout, Jr. *Steel Processing,* v. 40, July 1954, p. 421-436, 467.

Production engineering, quality control, metallurgy, industrial relations and utilities. Photographs, diagram, table. (F22)

296-F. Automatic Presses. T. W. Bannon. *Steel Processing,* v. 40, July 1954, p. 437-438, 470.

Development of automatic methods of handling parts and materials during production process. Photographs. (To be continued.) (F22, G1)

297-F. Upset Integral End Fittings for Thin-Walled Tubing. Gilbert C. Close. *Western Machinery and Steel World,* v. 45, July 1954, p. 92-95.

Application of method to forming ends of tubes. Photographs. (F26)

298-F. The Steel Mill Goes Modern. *Finish,* v. 11, Aug. 1954, p. 33-37, 66.

Expansion and improvement program of Youngstown Sheet and Tube Co. Photographs, diagrams. (F23, ST)

299-F. Cable Sheathing by Direct Extrusion. *Light Metals,* v. 17, July 1954, p. 214-215.

Equipment and operating procedures for extruding sheaths of high and commercial purity aluminum. Photographs, micrographs, diagram. (F24, Al)

300-F. Hydraulic Problems of Large Forging Presses. E. V. Crane and W. R. Jackson. *National Conference on Industrial Hydraulics, Proceedings of the 9th Meeting,* v. 7, 1953, p.56-69.

Overdrive vs. underdrive, hydraulic media, accumulator systems. Photographs, diagrams, graphs. (F22)

301-F. Self Contained Pump Units as Applied to Extrusion Presses. Adolphe J. de Matteo. *National Conference on Industrial Hydraulics, Proceedings of the 9th Meeting,* v. 7, 1953, p. 70-80.

Design of hydraulic control circuits for brass and aluminum extruders. Photographs, diagrams. (F24, Al, Cu)

302-F. Trends in Forging. Robert G. Friedman, *Tool Engineer,* v. 33, Aug. 1954, p. 145-147.

Advancements in forging blank preparation, precision press forging, horizontal deep piercing and cold forging. Photographs. (F22)

303-F. (German.) **Laboratory Scarfing of Rolled Billets.** Egon Ritter. *Stahl und Eisen,* v. 74, no. 15, July 15, 1954, p. 957-959.

Equipment and test results. Photographs. (F21, ST)

G
Secondary Mechanical Working

420-G. Machining Hard Materials. J. Hinnüber and O. Rüdiger. *Aircraft Production,* v. 16, July 1954, p. 260-265. (Based on a translation of "New Methods of Metalworking, in Particular Electro-Erosion." Published by *Werkstatt und Betrieb,* v. 87, no. 2, 1954, p. 53-57.)

Review of chemical, electrical, and ultrasonic - vibratory techniques. Photographs, micrographs, table, graphs. 27 ref. (G17)

421-G. Developments in Deep-Hole Boring. II. Small-Diameter D-Bit and Beisner-Head Boring. H. J. Pearson. *Aircraft Production,* v. 16, July 1954, p. 278-287.

Feed control; chip forms; cutting oils. Equipment. Photographs, diagrams. (G17)

422-G. How to Stretch-Form Aluminum. J. M. Adle. *American Machinist,* v. 98, July 19, 1954, p. 133-140.

Forming machines; tooling; lubricants. Diagrams, photographs. (G9, Al)

423-G. Flame Cutting With Electronic and Magnetic Tracers. R. F. Heimkamp. *Canadian Metals,* v. 17, June 1954, p. 46 + 4 pages.

Equipment and operating procedures. Photographs. (G22)

424-G. Machining Hard Metals With Electric Sparks. *Engineer,* v. 198, July 2, 1954, p. 11-12.

Equipment and procedures of "Sparcatron" process. Diagrams, photographs. (G17)

425-G. Investigations on Surface Finish of Steel Shafts. A. S. T. Thomson, A. W. Scott, W. Ferguson, and G. V. Stabler. *Institution of Engineers & Shipbuilders in Scotland. Transactions,* v. 97, pt. 7, 1953-1954, p. 549-591.

Effect of wear of scraping tool and recording the surface finish produced by combinations of wet scraping, grinding, emery polishing, honing, and superfinishing, and the times required for the various processes. Diagrams, graphs, photographs, tables. (G18, G19, ST)

426-G. Some Practical Aspects of Cutting Tool Nomenclature Arising From Recent Research. D. F. Galloway. *Institution of Mechanical Engineers, Proceedings,* v. 168, no. 1, 1954, p. 67-79 + 4 plates; disc., p. 79-88.

Nomenclature for the most commonly used types of tools is presented, together with typical examples of tool geometry, grinding methods, and inspection equipment. Tables, graphs, diagrams, photograph. (G17)

427-G. Carbides Mill Structural Members at High Speeds. Horace Frommelt. *Iron Age,* v. 174, July 15, 1954, p. 111-113.

Use of carbide cutters at high speed reduces cutting pressures and lowers production costs. Photographs. (G17)

428-G. Powder Processes Solve Tough Metal Removal Problems. I. R. S. Babcock. *Iron Age,* v. 174, July 22, 1954, p. 105-108.

Includes cutting, scarfing, gouging, lancing and washing of cast iron, high-temperature alloy steels, nickel and nickel alloys, copper and copper alloys, aluminum, reinforced concrete and firebrick. Photographs, tables, diagram. (To be continued.) (G22, CI, SS-h, Ni, Cu, Al)

429-G. Progressive Dies Speed Output of Cup-Shaped Parts. W. G. Patton. *Iron,* v. 174, July 22, 1954, p. 109-111.

Blanking, drawing, trimming, and flanging. Photographs. (G2, G4, CN)

430-G. High Temperature Alloys: Air Force Machinability Report. IV. *Iron Age,* v. 174, July 22, 1954, p. 112-114.

Life expectancy of tools used in milling, drilling, and turning. Tables, graphs. (G17, SG-h)

431-G. Soluble Oils. *Lubrication,* v. 40, July 1954, p. 85-92.

Manufacture and properties of cutting fluids. Preparation and service life of emulsions. (G21)

432-G. Shot Peening and Other Surface Working Processes. ASM Committee on Shot Peening. *Metal Progress,* v. 66, no. 1-A, July 15, 1954, p. 104-108.

Effects on fatigue strength. Photographs, tables, diagrams. 8 ref. (G23, Q7)

433-G. Press Forming of Sheet Steel. ASM Committee on Forming. *Metal Progress,* v. 66, no. 1-A, July 15, 1954, p. 134-140.

Cold forming of sheet steel in hydraulic or mechanical presses. Blanking, piercing, trimming, shaving, bending, forming, drawing, cold extrusion, and efficient utilization of sheet. Diagrams, table. (G general, CN)

434-G. Machining of Steel and Cast Iron. ASM Committee on Machining. *Metal Progress,* v. 66, no. 1-A, July 15, 1954, p. 141-151.

Chip formation; tool materials, angles, failure, and life; power requirements; cutting fluids; minimum cost; maximum production; dimensions of cut; selection of cutting speed; and general recommendations for planning production. Micrographs, photographs, diagrams, tables, graphs. 15 ref. (G17, CI, ST)

435-G. (French.) **Cutting Oils. Mechanical Tests.** H. L. Bingham. *Revue universelle des mines,* v. 10, ser. 9, no. 6, June 1954, p. 226-242.

Equipment and tests on drilling and lathe work. Photographs, diagrams, graphs. 6 ref. (G21)

436-G. (German.) **Turning Shafts With Cemented Carbide Cutting Tools.** Anton Mackert. *Stahl und Eisen,* v. 74, no. 14, July 1, 1954, p. 869-873.

Effects of type of metal and cutting conditions on efficiency. Diagrams, tables. 3 ref. (G17)

437-G. (German.) **The Economic Production of Cold-Drawn Cross-Sections of Special Forms With Consideration of Rough Hot-Rolled Cross Sections for Small and Average Orders.** Karl Wenderlich. *Stahl und Eisen,* v. 74, no. 14, July 1, 1954, p. 876-880.

Economical method of filling relatively small orders for special steel shapes. Tables, diagrams. (G4, ST)

438-G. (Russian.) **Ultrasonic Method of Perforating Hard Materials.** M. M. Pisarevskii. *Stanki i Instrument,* v. 25, no. 5, May 5, 1954, p. 16-20.

Equipment and principles of ultrasonic drilling. Diagrams, tables. (G17)

439-G. (Russian.) **Problem of Cutting Forces During Broaching.** P. G. Katsev. *Vestnik Mashinostroeniia,* v. 34, no. 6, June 1954, p. 44-46.

Pressure calculations at various stages of process. Diagram, tables, graphs. (G17, ST)

440-G. Cope Talks on Draw Dies. XV. Necked Shells Require Careful Reduction. Stanley R. Cope. *American Machinist,* v. 98, July 19, 1954, p. 130-132.

Precautions and dies for production of necked shells. Diagrams. (To be continued.) (G4)

441-G. Booth Ventilation for Swing Frame Grinders. W. D. Bamford. *British Cast Iron Research Association, Journal of Research and Development,* v. 5, June 1954, p. 331-364 + 2 plates.

Practical application in design. Tables, diagrams, photographs. (G18)

442-G. The Grinding of Steel. XVIII. Lapping. XIX. Superfinishing. *Edgar Allen News,* v. 33, July 1954, p. 159-160.

Includes diagram. (To be continued.) (G19)

443-G. Hobbing at High Cutting Speeds. H. A. Koop. *Engineers' Digest,* v. 15, July 1954, p. 287-288. (Translated from *Werkstattstechnik und Maschinenbau,* v. 44, no. 4, Apr. 1954, p. 155-157.)

Influence of cutting speed and rate of feed on tool life. Graphs, diagram. (G17)

444-G. Add Iron Powder to Flame to Improve Cutting of Stainless Steels. J. R. Kirwin and J. Holmstock. *Industry & Welding,* v. 27, Aug. 1954, p. 70 + 3 pages.

Improved cutting methods permit application to thicknesses in excess of 4 in. Photographs. (G22, SS)

445-G. The Selection and Use of Cutting Oils. *Mechanical World and Engineering Record,* v. 134, July 1954, p. 294-296.

Desirable characteristics, types and applications result in reduced machining costs. Photographs. (G21, G17)

446-G. Selection and Use of Honing Abrasives. *Metal-Working,* v. 10, Aug. 1954, p. 14-15.

Conditions that may be changed to improve honing. Recommended stones for specific applications. Tables. (G19, ST)

447-G. Trouble-Shooting in the Press Room. II. How to Avoid Return of Slugs Above the Die-Plate. Federico Strasser. *Modern Industrial Press,* v. 16, July 1954, p. 54-55.

Causes of returning of slugs and blanks into the space between die plate and stripper. Remedies. (G1)

448-G. The Forming of Aluminium Sheet. VI. Rubber-Die Pressing. H. Hinxman. *Sheet Metal Industries,* v. 31, no. 327, July 1954, p. 557-561, 573.

Description of presses, methods of minimizing wear of rubber pads, devices for increasing pressing pressure and pressing techniques. Photographs, diagrams. (To be continued.) (G8, Al)

449-G. Electrospark Machining. C. Paul Porterfield. *Steel Processing,* v. 40, July 1954, p. 443-446.

Contact, electrolytic and spark-initiated discharge methods. Diagrams, photograph. 6 ref. (G17)

450-G. Hard Bronze Draws Stainless Without Scratches. Arnold Walz. *American Machinst,* v. 98, Aug. 2, 1954, p. 106-109.

New alloy produces better results. Performance and special problems. Photographs, diagrams. (G4, Cu, SS)

451-G. Take Your Pick of a Million Grinding Wheels. Norman P. Robie. *American Machinist,* v. 98, Aug. 2, 1954, p. 114-116.

Factors in proper selection of abrasive. Photographs, tables. (G18)

452-G. Mist Cooling Goes to Work. I. Mist-Cooling Systems Improve Machining Operations. Richard F. Thuma and Jesse G. Sdano. **II. Mist Cooling Helps Some Planer Jobs.** W. G. Feuerpfeil, R. M. Titus and W. C. Thuerwachter. *American Machinist,* v. 98, Aug. 2, 1954, p. 117-132.

Advantages in working conditions, maintenance and safety. Increased tool life and better finish. Photographs, diagram. (G17, G21, ST)

453-G. Cope Talks on Draw Dies. XVI. Make Offsets in Dies or on Lathes. Stanley R. Cope. *American Machinist,* v. 98, Aug. 2, 1954, p. 134-136.

Several methods and their applications. Diagrams. (To be continued.) (G4)

454-G. New CO_2 Concept Machines Tough Alloys. George H. DeGroat. *American Machinist,* v. 98, Aug. 2, 1954, p. 152-154.

Original metallurgical properties maintained during cutting. Process and demonstrations described. Photographs, micrographs. (G17, G21, AY)

455-G. Machining Titanium. G. G. M. Carr-Harris. *Canadian National Research Council, Technical Information Service Report no.* 41, July 1954, 12 p.

Tool life, feed rates, drilling, reaming and other machining operations. 101 ref. (G17, Ti)

456-G. How to Machine Stainless Steels. I. Lester F. Spencer. *Modern Machine Shop,* v. 27, Aug. 1954, p. 97-109.

Stainless steel characteristics, equipment and tool materials, operational procedures and typical work jobs. Tables, photographs, diagrams. (To be continued.) (G17, SS)

457-G. Step Up Efficiency in Carbide Grinding. F. J. Lennon. *Steel,* v. 135, Aug. 9, 1954, p. 92-93.

Examines and evaluates various processes. Photographs, table, graph. (G18)

458-G. Design of Steel Parts for Cold Extrusion. D. I. Brown. *Tool Engineer,* v. 33, Aug. 1954, p. 63-65.

Contributes to cost reduction and increases basic design possibilities. Case histories and design problems. Diagrams. (G5, ST)

459-G. Thin-Walled Extrusion on the Drill Press. W. N. Parker. *Tool Engineer,* v. 33, Aug. 1954, p. 79-80.

Description and applications of the Uniskan extrusion method. Photographs, diagrams. (G5)

460-G. (German.) **Grinding of Slabs and Billets of High-Grade Steel Before Finish Rolling.** Robert Sachers. *Metalloberfläche,* Ausgabe A, v. 8, no. 7, July 1954, p. 103-104.

Evaluations of improved methods of detecting and eliminating surface defects. (G18, F21, ST)

461-G. (Russian.) **Means of Increasing the Efficiency of Metal Finishing.** S. M. Kedrov. *Stanki i Instrument,* v. 25, no. 6, June 1954, p. 1-7.

Abrasive lapping and polishing. Lubricants. Effect of abrasive grain size and surface active agents. Diagrams, graphs, table. (G19, CI, ST)

462-G. (Russian.) **Problem of Determining Force of Cold Heading.** G. A. Navrotskii. *Vestnik Mashinostroeniia,* v. 34, no. 7, July 1954, p. 30-34.

Testing devices and presses. Re-

sistance to deformation. Table, graphs, diagram, photograph, 4 ref. (G10, ST, Cu)

463-G. (Russian.) **Work Hardening and Residual Stresses During Reaming of Construction Steels.** P. E. D'iachenko and N. A. Podosenova. *Vestnik Mashinostroenia,* v. 34, no. 7, July 1954, p. 45-47.

Cutting speeds and surface quality of part being machined. Optimum radius of curvature of cutting tools. Graphs. (G17, ST)

464-G. (Russian.) **New Scale Pattern Device for Flame Cutting.** I. A. Antonov, Iu. V. Kurlovich and D. Ia. Shukhman. *Vestnik Mashinostroeniia,* v. 34, no. 5, May 1954, p. 78-80.

Series cutting of large objects by means of small-scaled patterns. Photographs. (G22, CN)

465-G. (Book.) **Deep Drawing.** J. Willis. Butterworths Scientific Publications, 88 Kingsway, London, W.C.2., England. 25s.

Engineering aspects. Equipment; theory; techniques. (G4)

466-G. (Book.) **Metalworking Tomorrow.** George F. Doriot. 136 p. Harvard Graduate School of Business Administration, Cambridge, Mass. $10.00.

Continuous casting, shell molding, investment casting, powder metallurgy, cold and hot extrusion, heavy press program, formdrawing, electromachining, electrolytic grinding and ultrasonic machining processes. (G general, E general, H general, F24)

467-G. (Book.) **Practical Sheet and Plate Metal Work.** Arthur Atkins. 6th Ed. 508 p. 1954. Sir Isaac Pitman & Sons, Ltd., Parker St. Kingsway, London, W.C.2. 20/—.

Reference book for those engaged in sheet metal work. (G general)

468-G. (Book.) **Proceedings of the Symposium on Machining and Grinding of Titanium.** Report no. PB 111375. 167 p. 1953. U. S. Department of Commerce, Room 6227, Commerce Building, Washington 25, D.C. $2.50.

Machining of titanium, internal and external grinding of titanium and its alloys, temperatures during machining, titanium alloy powders, and chip formation. (G17, G18, Ti)

H
Powder Metallurgy

116-H. Porous Metals in Aircraft. David B. Pall. *Aeronautical Engineering Review,* v. 13, July 1954, p. 36-41.

Properties of porous bronze and stainless steel. Uses in de-icing equipment, transpiration cooling, and filtration of fuels and lubricants. Tables, graphs, diagrams. 16 ref. (H general, T24, Cu, SS)

117-H. Machining, Joining and Finishing of Powder Metal Parts. ASM Committee on Powder Metallurgy. *Metal Progress,* v. 66, no. 1-A, July 15, 1954, p. 151-153.

Drilling, tapping, reaming, turning, boring, milling, shaping, grinding, burnishing, coining, joining, impregnation and infiltration, heat treating, and finishing. Diagrams, table. 7 ref.
(H general, G17, J general, L general)

118-H. (Russian.) **Regularities of Pressing Copper-Graphite Metal-Ceramic Compositions.** T. N. Znatokova and V. I. Likhtman. *Doklady Akademii Nauk SSSR,* v. 96, no. 3, May 21, 1954, p. 577-580.

Compressibility investigation on electrolytic copper with natural graphite. Tables, graphs. 2 ref. (H11, Cu)

119-H. (Russian.) **Permanent Magnets From Powders.** A. B. Al'tman. *Elektrichestvo,* 1954, no. 6, June, p. 65-69.

Production, structure, and properties. Graphs, tables. 6 ref. (H general, SG-n)

120-H. New Directions in Powder Metallurgy. Henry H. Haussner. *Precision Metal Molding,* v. 12, Aug. 1954, p. 42.

Use of metal hydrides. Making large-sized products by sinter welding and rolling metal powders. (H general)

121-H. Physical Properties of Powdered Brass Parts. D. C. Bradley. *Precision Metal Molding,* v. 12, Aug. 1954, p. 44-47, 81-82.

Variables affecting properties, and ductility of brass sinterings. Sintered density vs. properties. Graphs. (H11, Q23, Cu)

122-H. (German.) **The Powder-Metallurgical Method of Producing Copper Strip.** Hermann Franssen. *Zeitschrift für Metallkunde,* v. 45, no. 6, June 1954, p. 328-331.

Equipment and techniques for continuous production. Precautions in the production of alloys. Diagrams, photograph. 5 ref. (H general, Cu)

J
Heat Treatment

243-J. A Comparison of Economics and Methods for Heating Steel Strip. C. E. Peck. *Blast Furnace and Steel Plant,* v. 42, July 1954, p. 791-799.

Comparative study of various methods of annealing and tempering. Tables, graph. (J23, J29, ST)

244-J. Through-Carburizing Simplifies Production of Formed Parts. W. D. Latiano. *Iron Age,* v. 174, July 22, 1954, p. 115-117.

Low-carbon steel parts combine ease of forming with high physical properties. Photographs, diagram. (J28, CN)

245-J. Carbonitriding. ASM Committee on Heat Treating. *Metal Progress,* v. 66, no. 1-A, July 15, 1954, p. 124-126.

Process; equipment; atmospheres; composition, hardness and tempering of case; advantages of carbonitriding; disadvantages; and cost factors. Micrographs, tables, graphs. (J28)

246-J. The Agitation of Quenching Mediums. ASM Committee on Heat Treating. *Metal Progress,* v. 66, no. 1-A, July 15, 1954, p. 126-127.

Effect of flow rate of oil. Correlation curves for water, oil, and molten salt. Graphs. (J2)

247-J. The Cost of Heat Treating. ASM Committee on Heat Treating. *Metal Progress,* v. 66, no. 1-A, July 15, 1954, p. 128 + 4 pages.

Recommended procedures for determining costs. Cost of hardening a carburizing pinion gear. Comparative costs for carburizing by the batch gas method versus the continuous pack method. Comparative costs of gas and pack carburizing in two plants. Tables. (J general, J28, A4)

248-J. Case Hardening Steel by Carbonitriding. *Steel,* v. 135, July 26, 1954, p. 98-100, 102.

Advantages; methods. Photographs, table, diagram. (J28, ST)

249-J. Solution Heat Treating, Annealing and Strain Relieving in One Salt Bath Furnace. T. H. Atkinson and W. Paul Thompson. *Wire and Wire Products,* v. 29, July 1954, p. 744-745.

Versatility of the salt bath furnace in the production of cold headed products. (J2)

250-J. Modern Methods of Wire Annealing. *Wire Industry,* v. 21, July 1954, p. 704, 707.

Birlec furnace operation for annealing various types of wire. Photographs. (J23)

251-J. (Dutch) **The Furnace Laboratory. I.** C. H. Luiten. *Smit Medelelingen,* v. 9, no. 2, Apr.-June 1954, p. 54-58.

Laboratory work on development of heat treating processes and equipment. Photographs, diagrams. (J general)

252-J. (German.) **Three Years Experience in the Heat Treatment of Basic Steel for Arched Mine-Roof Supports.** Karl Fröhlich. *Glückauf,* v. 90, nos. 25-26, June 19, 1954, p. 637-651.

Strength properties and toughness requirements. Importance of proper melting, heat treating, testing, and processing. Photographs, tables, diagrams. 15 ref. (J general, Q23, T28, CN)

253-J. (Russian.) **Rapid Case Hardening With Induction Heating.** A. D. Assonov, K. Z. Shepeliakovskii, and P. A. Lankin. *Vestnik Mashinostroeniia,* v. 34, no. 6, June 1954, p. 56-60.

Equipment and techniques for automatic carburizing and nitriding. Tables, graph, photographs, diagrams. (J2, ST)

254-J. Heat-Treatment of High-Speed Steel. VI. Methods of Hardening. VII. Surface Treatments. S. G. Cope. *Metal Treatment and Drop Forging,* v. 21, June 1954, p. 295-302; July 1954, p. 343-347.

Hardening procedures including normal methods, bainite hardening and subzero cooling techniques. Nitriding, oxide coating and chromium plating. Graph, diagram, table. 32 ref. (To be concluded.)
(J26, J28, L14, L17, TS)

255-J. Modern Isothermal Heat Treating Methods Reduce Warpage, Cracking. Bernard P. Planner. *Western Metals,* v. 12, July 1954, p. 43-47.

Isothermal and salt bath quench heat treating methods. Equipment and procedures. Causes and remedies for defects. Photographs, graphs, tables. (J23, J2)

256-J. (German.) **Line Frequency Induction Heating of Light Metal Bars.** H. Rohn. *Aluminium,* v. 30, no. 7, July 1954, p. 298-300.

Experimental determination of capacity and current consumption and advantages of the process. Photographs, table. 6 ref. (J2, Al)

257-J. (Swedish.) **Effect of Temperature on the Decarburization Rate of Iron and Steel.** John Olof Edström and Stig-Erik Erikson. *Jernkontorets Annaler,* v. 138, no. 7, 1954, p. 414-422.

Theoretical calculation confirmed by tests on iron powders. Graphs, photomicrograph. 8 ref. (J28, CI, ST)

258-J. Modern Heat Treating. VII. Case Hardening Steel by Nitriding. *Steel,* v. 135, Aug. 9, 1954, p. 96-98.

Steel compositions, properties and structure. Nitriding procedures and furnaces. Photographs, tables. (J28, CN, AY)

259-J. (German.) **Cracking of Low Alloy Steels Caused by Abrupt Temperature Changes.** Wilhelm Rädeker. *Stahl und Eisen,* v. 74, no. 15, July 15, 1954, p. 929-941; disc., p. 941-943.

Effects of repeated quenching and reheating. Mechanism of crack formation. Micrographs, photographs, diagrams, tables, graphs. (J26, AY)

260-J. (German.) **Hardenability of Copper-Manganese-Nickel Alloys. I. Hardness and Structure Investigations.** Otto Dahl and Karl-Ludwig Dreyer. *Zeitschrift für Metallkunde,* v. 45, no. 6. June 1954, p. 342-349.

Effects of component ratios, heat treating conditions and rolling cycles on mechanical and electrical properties. Graphs, micrographs. 6 ref.
(J26, Q general, P15, Cu, Mn, Ni)

261-J. (Russian.) **Gas Carburization, With Induction Heating.** A. M. Tarasov and B. A. Stetsenko. *Vestnik Mashinostroeniia,* v. 34, no. 7, July 1954, p. 50-52.

Apparatus, operating conditions. Microstructure of gear teeth. Diagram, micrographs, photographs. (J28, J2, M27, ST)

262-J. (Russian.) **Electric Spark Hardening of Machine Parts.** A. V. Poliachenko. *Vestnik Mashinostroeniia,* v. 34, no. 7, July 1954, p. 65-70.

Treatment of cutting surfaces. Hardness and resistance to wear. Electrode compositions. Table, graphs, micrographs. 5 ref.
(J2, Q29, Q9, ST)

263-J. (Book.) **Aluminum Heat Treating.** 118 p. Reynolds Metals Co., Louisville, Ky. $1.00.

Nontechnical discussion of aluminum alloy metallurgy and heat treatment of cast aluminum products. (J general, Al)

K

Joining

511-K. A Production Application of Structural Adhesive Bonding. G. E. Holback and S. C. Burridge. *Aircraft Engineering,* v. 26, July 1954, p. 224-228.

Use of adhesives to join metal skins to low-density cores, and to replace rivets and bolts. Fabrication procedures. Photographs, graphs. (K12)

512-K. Weldability of a B-Mo Steel Related to Properties of the Heat-Affected Zone. C. L. M. Cottrell. *British Welding Journal,* v. 1, July 1954, p. 315-321.

Transformation characteristics and the mechanical properties of commercial low-carbon boron-molybdenum steel. Tables, graphs, micrographs. 11 ref.
(K9, Q general, N8, AY)

513-K. Cooling Rates in Typical Arc-Welded Joints. C. L. M. Cottrell and B. J. Bradstreet. *British Welding Journal,* v. 1, July 1954, p. 322-326.

Thermal severity curves relate weld size to cooling rate at 300° C in the heat-affected zone. Tables, graphs, photographs, diagrams. 2 ref. (K1)

514-K. Welding Tool Steels. B. H. Chambers. *Edgar Allen News,* v. 33, July 1954, p. 145-147.

Factors affecting economy and strength of deposit for flash-butt welding of tool steels. Micrographs, photographs. (K3, TS)

515-K. Modern Developments in the Design and Manufacture of Welded Pressure Vessels. M. B. Hamilton and J. McIntyre. *Institution of Engineers & Shipbuilders in Scotland, Transactions,* v. 97, pt. 7, 1953-1954, p. 525-548.

Inspection of materials, welding, fabrication of large vessels at site, and inspection of finished structures. Photograph. (K general, T26)

516-K. Design of Brazed Joints. ASM Committee on Brazed Joints. *Metal Progress,* v. 66, no. 1-A, July 15, 1954, p. 115-122.

Types of joints and their properties. Filler metals; brazing processes. Diagrams, tables, graphs. 17 ref. (K8)

517-K. Soldering. Some Considerations of the Process and Its Mechanism. Phillip N. Fisk. *Sheet Metal Industries,* v. 31, no. 327, July 1954, p. 567-569.

Methods of removing oxide layers; analysis of subsequent surface reactions. Diagrams. (K7)

518-K. Iron Powder Coatings. Electrode Design Matches Advance Billing. Jerry Hinkel. *Steel,* v. 135, July 19, 1954, p. 104-105.

Operating characteristics of rutile iron powder electrodes. (K1, T5, S1)

519-K. Adhesives Join the Assembly Line. Thomas F. Hruby. *Steel,* v. 135, July 26, 1954, p. 88-91.

Advantages of adhesive joining. Typical applications. Photographs, table. (K12)

520-K. Stitching With Steel. Ron T. Smith. *Steelways,* v. 10, Aug. 1954, p. 14-15.

Nontechnical review of stitching equipment and uses. Photographs. (K13)

521-K. Less Corrosive Soldering Fluxes. *Tin and Its Uses,* 1954, no. 30, p. 9.

Hydrozinc compounds as substitutes for zinc chloride and natural resin. (K7)

522-K. Solderability of Nickel-Flashed Brass. *Tin and Its Uses,* 1954, no. 30, p. 10.

Thin flash-coating of nickel applied to brass before tinning effects an enormous improvement in solderability. (K7, Cu)

523-K. Special Problems in Structural Welding for Bridges. Stewart Mitchell and Arthur L. Elliott. *Welding Journal,* v. 33, July 1954, p. 633-642.

Importance of bridge structures made of suitable steels, properly designed, and fabricated with reasonable care. Photographs, table, diagrams. 9 ref. (K general, T26, ST)

524-K. Adhesive Bonding Complements Soldering and Brazing. H. H. Simons. *Welding Journal,* v. 33, July 1954, p. 647-650.

Basic materials used in adhesives; characteristics, and comparison with other joining methods. Tables. (K12)

525-K. Automatic Horizontal and Vertical Welding of Field Erected Structures. Amel R. Meyer. *Welding Journal,* v. 33, July 1954, p. 651-659.

Newly developed flux-supporting devices permit automatic submerged-arc welding of horizontal and vertical joints. Diagrams, photographs, micrographs, tables. (K1, ST)

526-K. Packaging Welding Generators. A. F. Fino. *Welding Journal,* v. 33, July 1954, p. 660-662.

Solving electrical power problems for field-welded structures by consolidating individual power requirements into one heavy-duty diesel engine. Photographs. (K1)

527-K. Consumable Insert Method of Root Pass Welding. Theodore A. Risch and Alfred E. Dohna. *Welding Journal,* v. 33, July 1954, p. 670-679.

Butt welding plates or pipes with the inert-gas-shielded tungsten arc without the use of backing rings or bars. Diagrams, photographs, micrograph, table. (K1)

528-K. Effect of Electrode Type in the Notch Slow-Bend Test. William J. Murphy and R. D. Stout. *Welding Journal,* v. 33, July 1954, p. 305S-310S.

Using the Kinzel test, no increase in notch toughness is obtained with overmatching electrodes in welding plain carbon and high tensile steels as compared with E6010 electrodes. Tables, graphs. 5 ref.
(K1, Q5, AY, CN)

529-K. Study of the Cooling Rates in Flash Welds in Steel. E. F. Nippes, Warren F. Savage, Gordon Grotke and S. M. Robelotto. *Welding Journal,* v. 33, July 1954, p. 339S-362S.

Functions of clamping distance, material thickness, and rate of platen acceleration using parabolic flashing patterns. Tables, graphs, micrographs. 5 ref. (K3, ST)

530-K. The Significance of the Tension Test for Spot Welds. E. R. Funk. *Welding Journal,* v. 33, July 1954, p. 363S-365S.

Improved test for evaluating spot weld quality. Diagrams. (K3, K9)

531-K. (Dutch.) **Apparatus for Measuring Current and Stresses During Argon-Arc Welding.** K. K. Zwart and P. DeJong. *Smit Mededelingen,* v. 9, no. 2, Apr.-June 1954, p. 50-53.

Control of factors necessary for comparable and reproducible test results. Diagrams, graph. (K1)

532-K. (French.) **Utilization of Oxy-Acetylene Flame in Various Welding Processes.** H. Granjon and M. Evrard. *Soudure et Techniques connexes,* v. 8, nos. 5-6, May-June 1954, p. 145-159.

Heat treatment of steel welds; recrystallization of metals below the transformation point; degassing of arc welds; and welding of aluminum. Tables, micrographs, photographs, diagrams.
(K2, K1, J2, ST, Al)

533-K. (French.) **The Amount of Hydrogen in Arc Welds on Soft Steels. Method of Expressing Results Which Permits Characterizing the Electrodes.** A. Roux. *Soudure et Techniques connexes,* v. 8, nos. 5-6, May-June 1954, p. 160-168; disc., p. 168-169.

Test conditions and results. Tables, graphs, photograph. 3 ref.
(K1, ST)

534-K. (German.) **Composition and Form of Nonmetallic Inclusions in Electric Arc Welding.** Kurt Born. *Stahl und Eisen,* v. 74, no. 13, June 17, 1954, p. 822-831; disc., p. 831.

Effects of type, amount, and distribution of inclusions. Diagrams, photographs, tables, graphs, micrographs. 17 ref. (K1, ST)

535-K. (Russian.) **Automatic Welding of Thick-Walled High-Pressure Boiler Drums.** I. N. Gerasimenko. *Vestnik Mashinostroeniia,* v. 34, no. 6, June 1954, p. 76-78.

Operating conditions. Tables, photographs, diagram. 5 ref. (K1)

536-K. (Russian.) **Causes of Honeycomb Formation in Butt Welds of Small-Diameter Pipes.** V. M. Kondrat'ev and G. L. Petrov. *Vestnik Mashinostroeniia,* v. 34, no. 6, June 1954, p. 78-83.

Causes of various welding defects and their elimination. Micrographs, tables, graph, diagrams.
(K general, CN)

537-K. (Russian.) **Electric Arc Welding of Chromium-Nickel Alloy Sheets.** F. S. Bugrii. *Vestnik Mashinostroeniia,* v. 34, no. 6, June 1954, p. 83-84.

Effect of metal thickness, seam dimensions, electrode diameter, and current strength. Micrographs, tables, diagrams. (K1, Ni, Cr)

538-K. (Russian.) **Welding of Thin Sheet Steel.** V. N. Mikhin. *Vestnik Mashinostroeniia,* v. 34, no. 6, June 1954, p. 85-87.

Difficulties of working with thin sheets; electrode types and sizes; and types of joints. Diagrams, photograph, table. (K1, ST)

539-K. (Russian.) **Electric Furnace Melting of Flux for Automatic Welding.** M. M. Timofeev. *Vestnik Mashinostroeniia,* v. 34, no. 6, June 1954, p. 88-90.

Physico-chemical process during melting of high manganese fluxes. Effect of fusion temperature and melting time on change of chemical composition. Tables, graphs. 5 ref. (K1)

540-K. (Spanish.) **Design for Welded Construction.** F. Koenigsberger. *Ciencia y técnica de la Soldadura,* v. 4, no. 16, Jan.-Feb. 1954, 12 p.

Practical methods. Graphs, table, diagrams. (K general)

541-K. Core Wire for the Production of Extruded Metal-Arc Welding Electrodes. W. I. Pumphrey. *Australasian Engineer,* May 1954, p. 48-49.

Suitability of wire for use as core wire in electrode production determined by chemical composition, surface quality and dimensional reliability. (K1)

542-K. Some Fundamental Problems in Percussive Welding. Eric Eden Sumner. *Bell System Technical Journal,* v. 33, July 1954, p. 885-895.

Effect of voltage variation and arc duration. Analysis of bridging. Improved methods and equipment. Diagrams, photographs, graphs. (K3)

543-K. Automatic Contact Welding in Wire Spring Relay Manufacture. A. L. Quinlan. *Bell System Technical Journal,* v. 33, July 1954, p. 897-923.

Projection-type resistance and percussion welding of precious metal contacts to wire relay springs. Photographs, diagrams, graphs. (K3)

544-K. Modern Welding Technique. IV. Miscellanea. Sec. 25. Safety in Welding. E. T. Gill and Eric N. Simons. *Edgar Allen News,* v. 33, July 1954, p. 161.

(To be concluded.) (K general, A7)

545-K. Helium-Nitrogen Shielding Gas Improves Welding of Low-Carbon Steel. Eugene L. Turner and Walter F. Heller. *General Motors Engineering Journal,* v. 1, July-Aug. 1954, p. 9-11.

Nitrogen mixed with helium promises significant cost reduction and improved weld quality. Comparison tests of various gases and mixtures. Tables, radiographs, photographs. 3 ref. (K2, CN)

546-K. Nitrogen Prevents Contamination of Inert Arc Welds in Stainless Piping. E. B. LaVelle. *Industry & Welding,* v. 27, Aug. 1954, p. 35 + 5 pages.

Advantages of nitrogen as a purging gas from standpoint of safety, corrosion rate and quality of weld. Micrographs. (K1, SS)

547-K. "Cool" Welding Eliminates Cracking in Silicon-Monel. Bela Ronay. *Industry & Welding,* v. 27, Aug. 1954, p. 40-41.

Advantages of and procedure for controlled repair welding of silicon-monel propellers. Photographs. (K6, Ni)

548-K. Make Intricate Structures From Brazed Aluminum Castings. J. H. Dunn and E. P. White. *Industry & Welding,* v. 27, Aug. 1954, p. 44 + 5 pages.

New techniques and advantages of brazing cast assemblies, including cylinder heads, crank cases and valve seats. Photographs, diagrams. (K8, Al)

549-K. Two-Sided Machines Step up Resistance Welding Production. George Murphy. *Industry & Welding,* v. 27, Aug. 1954, p. 52-54.

Automatic spot welder reduces number of operations, cuts time and costs, provides additional floor space and increases operator safety. Photographs. (K3)

550-K. Adhesive Bonding Magnesium Assemblies. D. A. Tooley. *Modern Metals,* v. 10, July 1954, p. 40, 42-43.

Application of organic bonding compounds. Photographs, graph. (K12, Mg)

551-K. The Welding of Monel and K-Monel. F. A. Ball. *Sheet Metal Industries,* v. 31, no. 327, July 1954, p. 562-566, 571.

Techniques of metallic, carbon, argon-arc, atomic hydrogen and oxy-acetylene welding. Table, diagrams, photographs, micrographs. (To be concluded.) (K1, K2, Ni)

552-K. Fast Roll-Spot Technique Doubles Welding Speeds. Bill Brotherton. *Steel Processing,* v. 40, July 1954, p. 439-440.

New technique with modified facilities has stepped up production. Photographs. (K3)

553-K. How About Welding the Aluminum Alloys? II. Procedures for Seam and Flash Welding. Lester F. Spencer. *Welding Engineer,* v. 39, July 1954, p. 42-44.

Resistance welding the aluminum-base alloys, equipment, preweld cleaning, machine settings and heat problems. Photographs, table. 7 ref. (K3, Al)

554-K. Alloy Welds Deposited in "Unalloyed" Titanium Base Metal. I. C. E. Hartbower and Daniel M. Daley, Jr. *Welding Journal,* v. 33, July 1954, p. 311S-326S.

Method for improving toughness and strength of weld joints. Diagrams, tables, photographs, micrographs. 5 ref. (K general, Ti)

555-K. (French.) **Study on Furnace Brazing of Aluminum and Light Alloys.** Roger Biais. *Métaux, Corrosion-Industries,* v. 29, no. 345, May 1954, p. 190-201.

Definitions, principles and specific problems. Diagrams, photograph, micrographs, graphs. 9 ref. (K8, Al)

556-K. (Russian.) **Preparing Pipes for Welding.** E. K. Korchinskii. *Energetik,* v. 2, no. 4, Apr. 1954, p. 17.

Device for cutting and beveling boiler pipes preparatory to welding. Diagrams. (K general)

557-K. It's Here! A Welded Steel Home. Clyde B. Clason. *Welding Engineer,* v. 39, Aug. 1954, p. 17-20.

Lightweight steel sections used in producing a newer, more desirable home with lower construction costs. Photographs. (K general, T26, ST)

558-K. Powdered Iron in the Coating? L. F. Megow. *Welding Engineer,* v. 39, Aug. 1954, p. 21.

Standard E-6013 electrode preferred over powdered coating electrode from cost standpoint. Photographs, table. (K1, T5, Fe)

559-K. "Shotwelding" Santa Fe Cars. Herman C. Phelps. *Welding Engineer,* v. 39, Aug. 1954, p. 28-31.

Resistance welding methods used to build stainless steel passenger cars for railroads. Photographs. (K3, SS)

560-K. Piping and Petroleum Plus Welding and Flame-Cutting. Jay Bland. *Welding Engineer,* v. 39, Aug. 1954, p. 32-35.

Oxy-acetylene flame solves many maintenance and repair problems for oil refineries. Photographs. 1 ref. (K2, G22, ST)

561-K. Tailored-to-Job Fixtures Speed Submerged-Arc Welding. Fred M. Burt. *Welding Engineer,* v. 39, Aug. 1954, p. 36-38, 52.

Method overcomes problems in fabrication of welded tanks and pressure vessels. Photographs. (K1, ST)

562-K. (French.) **Some Ideas on Welded Construction of Large Spherical Reservoirs.** Ed. Henrion. *Ossature métallique,* v. 19, nos. 7-8, July-Aug. 1954, p. 356-360.

Prescribed thickness of walls, methods of assembly and welding techniques. Photographs. (K general, CN)

563-K. (French.) **Welded Metallic Construction in the Oil Industry.** R. Chirol. *Ossature métallique,* v. 19, nos. 7-8, July-Aug. 1954, p. 369-381.

Welding materials and techniques for various units of an oil refinery. Photographs, diagrams. (K general)

564-K. (French and German.) **Automatic Arc Welding Machines and Their Industrial Application.** W. Koch. *Zeitschrift für Schweisstechnik,* v. 44, no. 7, July 1954, p. 139-148.

Electrodes and equipment for submerged-arc welding. Use of single and multiple electrodes. Diagrams, photographs. (K1)

565-K. (German.) **Problems of Soldering and Brazing.** J. Colbus. *Schweissen und Schneiden,* v. 6, no. 7, July 1954, p. 287-296.

Definition of terms, metallurgical principles, conditions for bonding, experimental procedure, effect of flux on soldering temperature and strength of joints. Diagrams, photographs, micrographs, tables, graphs. 30 ref. (K7, K8)

566-K. (German.) **Advances in the Field of Welding and Cutting. Important Recent Publications on the Metallurgy of Welding Ferrous Materials.** K. L. Zeyen. *Schweissen und Schneiden,* v. 6, no. 7, July 1954, p. 298-310.

Critical review of recent literature. 209 ref. (K general, G22)

567-K. (German.) **Bending Devices for Weld Tests.** A. Hahn. *Schweissen und Schneiden,* v. 6, no. 7, July 1954, p. 310-311.

Improved device for testing bend strength of welded joints. Photographs. (K9, Q5)

568-K. (German.) **Weldable Structural Steels.** Hubert Hauttmann. *Schweisstechnik,* v. 8, no. 5, May 1954, p. 49-51.

Criteria for evaluating weldability. Tables, graphs, photograph. 6 ref. (K9, CN)

569-K. (German.) **Welding Under Protective Gas.** Alfred Schmidt. *Schweisstechnik,* v. 8, no. 5, May 1954, p. 52-56.

History, applications and comparison of inert-gas welding. Photographs, diagrams, tables. (To be concluded.) (K1, ST)

570-K. (German.) **A Review of Welding and Soldering Methods for Aluminum and Light Metal Alloys.** Ernst Klosse. *Werkstoffe und Korrosion,* v. 5, no. 7, July 1954, p. 246-251.

Techniques and materials. Graphs. (K general, Al, Mg)

571-K. (Russian.) **Electric Arc Welding With Copper Electrodes Having Special Coatings.** N. M. Stepanov-Grebennikov and N. I. Makeev. *Vestnik Mashinostroeniia,* v. 34, no. 7, July 1954, p. 61-64.

Joining copper and brass to various steels. Corrosion tests of welds. Microstructures. Tables, micrographs, diagram. (K1, R11, Cu, CN, SS)

572-K. (Russian.) **Means of Increasing Productivity in Manual Arc Welding of 18-8 Type of Stainless Steel.** Iu. I. Kazennov, A. N. Krutikov, L. P. Kolosova and P. T. Dmitriev. *Vestnik Mashinostroeniia,* v. 34, no. 5, May 1954, p. 74-77.

Advantages of bundled electrodes and 3-phase arc. Tables, graphs, micrograph. 7 ref. (K1, SS)

573-K. (Russian.) **Automatic Welding of Circular Objects.** I. D. Volontsevich and A. A. Luchikhin. *Vestnik Mashinostroeniia,* v. 34, no. 5, May 1954, p. 77-78.

Simple, inexpensive method using ordinary apparatus. Diagram, photograph. (K1, SS)

574-K. (Russian.) **Influence of Surface Cleanliness of Tube Blanks on the Quality of Pipe Welds.** B. D. Zhukovskii and L. I. Zil'bershtein. *Vestnik Mashinostroeniia,* v. 34, no. 5, May 1954, p. 82-84.

Cleaning by shot peening under 4.0 to 4.5 atmospheres leads to better welds. Diagrams, graphs, table. (K general, G23, CN)

575-K. (Spanish.) **Design of Welded Structures.** F. Koenigsberger. *Ciencia y técnica de la Soldadura,* v. 4, no. 17, Mar.-Apr. 1954, 12 p.

Plans for structures varying according to conditions of precision, strength and quality of welds. Diagrams, photograph. (K general, ST)

576-K. (Spanish.) **Oxy-Acetylene Welding.** *Ciencia y técnica de la Soldadura,* v. 4, no. 17, Mar.-Apr. 1954, p. 127-136.

Detailed instructions for welders. Tables, diagrams. (K2, ST)

577-K. (Book.) **Projection Welding of Mild Steel.** 14 p. British Welding Research Association, 29, Park Crescent, London, W.1. 3s. 6d.

Machines and electrodes, materials to be used, types of projections, and machine settings for various thicknesses of material. (K3, CN)

578-K. (Book.) **Welding Alcoa Aluminum.** 176 p. 1954. Aluminum Co. of America, Alcoa Bldg., Pittsburgh 19, Pa. Free.

Welding methods; weld performance; quality control procedures. (K general, Al)

579-K. (Book.) **Welding Review Year Book.** J. V. Brittain, ed. 292 p. 1954. Engineering Trader Ltd., Morley House, 26-30 Holborn Viaduct, London, E.C.1, England. 9s.6d.

Practical welding, soldering and brazing processes. (K general)

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Cleaning, Coating and Finishing

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Electrical equipment and circuits for a tinning line powered by a single generator. Diagrams. (L17, Sn)

661-L. Methods of Application. Arthur W. Slocum. *American Paint Journal,* v. 38, July 26, 1954, p. 80 + 5 pages.

Spray, dip, flow coat, roller coat, and tumble systems and their variations. 13 ref. (L26)

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Performance of cans. Suitability of Australian lacquers for the protection of electrotin plate against internal corrosion. Photographs, tables. 23 ref. (L17, L26, R5, Sn)

663-L. Industrial Alloy Plating With Special Reference to Plating of the Alpha-Phase. T. Banerjee. *Central Electrochemical Research Institute, Karaikudi, Bulletin,* v. 1, Jan. 1954, p. 8-10.

Literature review. Relation between properties of electrodeposited alloys and their crystal structure. 14 ref. (L17, M26, Cu)

664-L. Brass Plating With Special Reference to Plating From Non-Cyanide Baths. S. K. Ray. *Central Electrochemical Research Institute, Karaikudi, Bulletin,* v. 1, Jan. 1954, p. 11-13.

Review of research and development work on nonpoisonous baths. 18 ref. (L17, Cu)

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Electropolishing techniques. Advantages of process. 8 ref. (L13)

666-L. We Are Painting Shock Absorbers Electrostatically. I. J. Samuelson. *Industrial Finishing,* v. 30, July 1954, p. 18-21.

Equipment and operating procedures. Photographs, diagram. (L26)

667-L. Some Recent Developments in Vapour Blasting. *Machinery (London),* v. 85, July 2, 1954, p. 11-19.

Operation and advantages of the process. Photographs, micrographs, graph, diagrams. (L10, AY)

668-L. Barrel Finishing Operations on Accounting Machine Components. *Machinery (London),* v. 85, July 9, 1954, p. 55-61.

Results obtained with a new rotofinish installation. Photographs, diagrams. (L10)

669-L. Simplified Waste Treatment Methods for the Electroplating Industry. Leslie E. Lancy. *Metal Finishing,* v. 52, July 1954, p. 66-71.

Integrated waste treatment systems for cyanide copper and chromium plating plants. Photographs. 12 ref. (L17, A8, Cr, Cu)

670-L. Electroless Nickel Plating on Non-Ferrous Metals. Harry J. West. *Metal Finishing,* v. 52, July 1954, p. 72.

Bath formula; techniques. (L14, Ni, EG-a)

671-L. Government Finishing Specifications. N. E. Promisel and David M. Promisel. *Metal Finishing,* v. 52, July 1954, p. 73.

Specifications for phosphoric-acid base metal conditioner and rust remover. (L14, S22)

672-L. Selection of Metal Cleaning Methods. ASM Committee on Metal Cleaning. *Metal Progress,* v. 66, no. 1-A, July 15, 1954, p. 131-134.

Removal of drawing compounds, chips, cutting oils, polishing compounds, scale, and other materials from steel parts. Health hazards. (L10, L12, ST)

673-L. Disposal of Electroplating Wastes by Oneida, Ltd. I. Survey of Wastes. Charles A. Walker and Paul W. Eichenlaub. **II. Development of Treatment Processes.** Charles A. Walker, Walter Zabban, Raymond W. Southworth, and E. P. Heslin. *Sewage and Industrial Wastes,* v. 26, July 1954, p. 843-853.

Treatment facilities and procedures for cyanide and alkali wastes. Diagram, tables. 6 ref. (L17, A8)

674-L. A Survey of the Vitreous-Enamelling Industry in Sweden, Denmark and Finland. J. H. Gray. *Sheet Metal Industries,* v. 31, no. 327, July 1954, p. 589-599.

Equipment and processes; costs; production statistics. Tables, photographs. (L27)

675-L. Engineering Metal Finish. Methods, Materials Command Equal Stature. Robert J. Deisenroth. *Steel,* v. 135, July 19, 1954, p. 115-116, 121.

Finishing cycle for application of all-weather paint coating on metal furniture. Photographs, tables. (L26)

676-L. Displacement Tinning of Aluminium. *Tin and Its Uses,* 1954, no. 30, p. 8.

Chloride and stannate processes of immersion coating; etching treatments; problems of adhesion. (L16, Sn, Al)

677-L. Recent Developments in Hardfacing. E. N. Gregory. *Welding and Metal Fabrication,* v. 22, July 1954, p. 272-273.

Discussion of electrodes and automatic methods. (L24)

678-L. Sprayed Plastic Coatings for Fabricated Wire Articles. R. Dickinson. *Wire Industry,* v. 21, July 1954, p. 701-702.

Surface preparation and application methods. (L26)

679-L. (French.) **The Conditions of Growth of Anodic Aluminum Oxide Films.** J. Hérenguel and P. DeLong. *Revue de métallurgie,* v. 51, no. 6, June 1954, p. 411-418; disc. p. 418.

Interferometric method used to study increase in thickness of film and its refractive index. Micrographs, graphs, table, photographs. 9 ref. (L19, Al)

680-L. (German.) **The Intensified Attack of Zinc on Iron in Temperature Region of 500 C.** Dietrich Horstmann. *Archiv für das Eisenhüttenwesen,* v. 25, nos. 5-6, May-June 1954, p. 215-219.

Structure and transformation of iron-zinc alloys during galvanizing. Micrographs, graphs. 10 ref. (L16, M27, Fe, Zn)

681-L. (German.) **Conditions of Deposition and Structure of Dense Electrolytic Metal Deposits. I. Electrolytic Copper Deposits in the Range of Field-Oriented Texture Type and the Unoriented Dispersion Type.** J. Elze. *Metall,* v. 8, nos. 13-14, July 1954, p. 519-526.

Preparation of deposits and samples, microstructure and hardness studies, effect of inhibitors in electrolyte, and impurities in deposits. Tables, micrographs. 30 ref. (L17, M27, Q29, Cu)

682-L. (German.) **Runs on Zinc Galvanized Sheet Metals and Utensils.** Hans-Joachim Wiester and Dietrich Horstmann. *Stahl und Eisen,* v. 74, no. 13, June 17, 1954, p. 831-834.

Defect formation in hot-dipped sheet metal. Photographs, micrographs. 3 ref. (L16, Zn, ST)

683-L. (German.) **Streaking on Zinc Galvanized Sheet Metals.** Hans-Joachim Wiester and Dietrich Horstmann. *Stahl und Eisen,* v. 74, no. 13, June 17, 1954, p. 835-838.

Surface defects or adsorbed hydrogen as causes. Photographs, micrographs. 9 ref. (L16, Zn, ST)

684-L. (German.) **The Acid Pickle—A Closed Circuit?** Walter Fackert. *Stahl und Eisen,* v. 74, no. 14, July 1, 1954, p. 888-894.

Theoretical and laboratory investigation of circulating bath which retains constant H_2SO_4 concentration. Graphs, table, diagrams. 3 ref. (L12)

685-L. (German.) **Plant Investigations on Galvanizing Tanks.** Kurt Lewus. *Stahl und Eisen,* v. 74, no. 14, July 1, 1954, p. 903-904.

Measurements of bath and tank-wall temperatures, heat input and losses, and gas consumption under different operating conditions. Graphs. 1 ref. (L16, Zn)

686-L. (Russian.) **Process of Electrochemical Deposition of Oxygen on Nickel.** L. M. Elina, T. I. Borisova, and Ts. I. Zalkind. *Zhurnal Fiziches-*

koi Khimii, v. 28, no. 5, May 1954, p. 785-796 + 2 plates.

Curves of oxygen overvoltage at nickel electrode; nickel electrode charging; and fall of excess voltage after current shut-off. Diagram, graphs, tables, oscillograms. 15 ref. (L17, Ni)

687-L. (Russian.) **Cathodic Polarization During Precipitation of Copper From Pyrophosphate Solutions.** I. G. Shcherbakov, and I. L. Agafonov. *Zhurnal Fizicheskoi Khimii*, v. 28, no. 5, May 1954, p. 865-872.

Relation of polarization to concentration of complex anion. Effect of temperature and current density. Diagram, graphs, tables. 10 ref. (L17, Cu)

688-L. (Russian.) **Reduction of Nickel by Hypophosphate. I. Conditions of Formation and Some Properties of Platings. II. Problem of Reaction Mechanism.** K. M. Gorbunova and A. A. Nikiforova. *Zhurnal Fizicheskoi Khimii*, v. 28, no. 5, May 1954, p. 883-901 + 1 plate.

Factors affecting plating. Structure and properties of nickel platings. Tables, graphs, micrographs. 15 ref. (L17, Ni)

689-L. Plating in the Automotive Industry: Its History and Development. William M. Phillips. *Metal Finishing*, v. 52, July 1954, p. 60-65.

Chronological milestones since 1892. Photographs, table. (To be continued.) (L17, T21, A2)

690-L. Metal Cleaning. K. G. Lewis. *Metal Treatment and Drop Forging*, v. 21, June 1954, p. 277-283; July 1954, p. 335 + 8 pages.

Chemical and electrolytic pickling and descaling. Solution control by inhibitors. Descaling solutions for stainless steels. Tables, diagrams, photographs. 64 ref. (To be continued.) (L12, L13, SS)

691-L. Oxidation Resistance of Diffusion Coatings on Sintered and Swaged Molybdenum Wire. C. J. Leadbeater and D. T. Richards. *Metal Treatment and Drop Forging*, v. 21, July 1954, p. 309-315.

Volatilization of molybdenum oxide checked by treatment with single and duplex coatings. Preparation and physical considerations. Tables, micrographs, graphs. 3 ref. (To be continued.) (L15, R2, Mo)

692-L. Protection of Steel. I. Martin E. Schleicher. *Paint Industry Magazine*, v. 69, July 1954, p. 18-19.

Surface preparation by chemical solvent and physical methods. (To be continued.) (L general, ST)

693-L. Paint Film Defects and Their Remedies. III. Cissing: Pinholing: Blistering. H. J. Testro. *Product Finishing*, v. 7, June 1954, p. 81-87.

Review of terms used to define types of paint film failure and possible remedies, Photographs. (L26)

694-L. Finishes for Aluminum. I. Mechanical Finishing. R. Vanden Berg. *Screw Machine Engineering*, v. 15, July 1954, p. 37-40.

Barrel burnishing, grinding, brushing and buffing. Photographs. (L10, Al)

695-L. (French.) **Study of Anodic Dissolution by Means of Faraday Law.** Israel Epelboin and Michel Froment. *Comptes rendus*, v. 238, no. 25, June 21, 1954, p. 2416-2418.

Determination of necessary energy. 2 ref. (L19)

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Influence of length of immersion, rate of shrinkage and blowing. Tables, graphs, diagram. (L16, Zn)

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Physical and chemical reactions producing good adhesion properties. Tables. 21 ref. (L26, Al)

698-L. (German.) **New Protective Process for Use on Aluminum as a Form Material for Concrete.** H. Kessler. *Aluminium*, v. 30, no. 7, July 1954, p. 285-287.

Film for protection against mechanical and chemical damage to aluminum. 6 ref. (L14, Al)

699-L. Hard Chrome Can Be Plated to 'Tenths' in Production. George de Mirjian. *American Machinist*, v. 98, Aug. 2, 1954, p. 101-103.

Controlled solution temperatures, current density and plating time eliminates subsequent grinding and lapping to size, provides better surface. Photographs, graph, diagram. (L17, Cr)

700-L. Corrections for Seven Defects in Enameled Aluminum. *Ceramic Industry*, v. 63, Aug. 1954, p. 67-68.

Defects include low gloss and acid resistance, spalling and tearing. (L27, Al)

701-L. Topic of the Month. A Method of Protecting Heating Coils in Some Corrosive Solutions. G. G. Schmuck and R. W. Flournoy. *Corrosion*, v. 10, Aug. 1954, p. 231.

Fluorocarbon plastic material found useful in many corrosives at temperatures up to 400° F. Heat transfer loss is insignificant. Photograph. (L26)

702-L. Investigation of Synthetic Fingerprint Solutions. Stanley J. Eisler and Harry L. Faigen. *Corrosion* v. 10, Aug. 1954, p. 237-242.

Method removes contaminants from steel surfaces in preparing material for storage. Tables, photographs. 18 ref. (L12, ST)

703-L. Testing Tank Car Linings. J. Robert Spraul. *Corrosion*, v. 10, Aug. 1954, p. 243-247; disc., p. 247.

Corrosive factors and conditions for preferred use of protective coatings on tank car interiors. Tables, photograph. 4 ref. (L general)

704-L. Electronic Configuration in Electrodeposition From Aqueous Solution. III. Metal Deposition From Certain Complex Ions. Ernest H. Lyons, Jr., John C. Bailar, Jr., and H. A. Laitinen. *Electrochemical Society, Journal*, v. 101, Aug. 1954, p. 410-414.

Determinated by cathode current efficiencies and polarograms. Tables. 30 ref. (L17)

705-L. Electromachining and Superfinishing as a Production Tool. I. The Process and Its Applications. A. T. Steer. *Electroplating and Metal Finishing*, v. 7, July 1954, p. 249-255.

Use of electropolishing solutions for controlled removal of metal and to produce a smooth and lustrous surface. Micrographs, tables, graphs. 8 ref. (L13, G17)

706-L. Nickel and Chromium Plating of Zinc Base Die Castings. *Electroplating and Metal Finishing*, v. 7, July 1954, p. 257-262.

Properties of the die castings, methods of polishing, cleaning and etching, direct nickel plating, the use of various copper strike processes and barrel plating. Tables, photographs. 8 ref. (L17, Cr, Ni, Zn)

707-L. Depreciation and Maintenance of Metal Finishing Plant. III. The 'Percentage' Method of Computing Depreciation of Plant. S. Howard Withey and F. Comm. *Electroplating and Metal Finishing*, v. 7, July 1954, p. 263-265.

Advantages of method. Examples. Tables. (To be continued.) (L general, A5)

708-L. Sprayed Zinc Coatings for the Protection of Iron and Steel. E. E. Halls. *Electroplating and Metal Finishing*, v. 7; *Metal Spraying*, v. 4, July 1954, p. 279, 281, 283-284.

Description of spraying process, use in combination with paint finishes. Photographs, table. (To be concluded.) (L23, L26, Zn, ST)

709-L. Flame-Sprayed Plastic Coatings. M. M. Renfrew and A. J. Freeman. *Organic Finishing*, v. 15, July 1954, p. 8-10.

Equipment and materials, advantages and disadvantages. Photographs. 7 ref. (L26)

710-L. A New Method of Protecting Magnesium. R. Stricklen. *Precision Metal Molding*, v. 12, Aug. 1954, p. 59 + 7 pages.

Chromate conversion coating. Properties, surface preparation, application and testing. Photographs, tables. 4 ref. (L14, Mg)

711-L. Automatic, Bulk Flash Removal on Die Castings. Eugene F. Anderson. *Precision Metal Molding*, v. 12, Aug. 1954, p. 65-67, 82.

Airless blasting machine avoids much hand work. Photographs. (L10)

712-L. Finishing Metal Surfaces for Aircraft Gas Turbines. W. B. Stephenson, Jr. *Products Finishing*, v. 18, Aug. 1954, p. 24-29.

Surface protection from corrosion and abrasion at temperatures and in air velocities far beyond natural element exposure. Photographs, diagram. (L general)

713-L. A Review of Cleanliness Tests Jay C. Harris. *Products Finishing*, v. 18, Aug. 1954, p. 32-36.

Compilation of methods. Tables. 6 ref. (L10, L12, L13)

714-L. Electroforming. A Method for Producing Intricate Shapes. Vernon A. Lamb and W. H. Metzger, Jr. *Tool Engineer*, v. 33, Aug. 1954, p. 55-62.

Matrix design and use, part design factors, metals and plating solutions. Photograph, micrographs, tables, diagrams. 5 ref. (L18)

715-L. British Trends and Advances in Metal Finishing. S. Wernick. Paper from "International Review of Metal Finishing". Sawell Publications, Ltd., p. 21 + 18 pages.

Tin alloy deposition, design of automatic and barrel plating plant, mechanical and electrolytic polishing. Bright nickel plating and chromium plating. Uses of plastics in the plating shop. Organic finishes and finishing. Photographs, micrographs. (L17, L10, L13, L26)

716-L. Progress and Developments in Electrodeposition in Belgium Since 1945. R. Corbiére. Paper from "International Review of Metal Finishing". Sawell Publications, Ltd., p. 53-55.

Wartime difficulties, improvements in baths and equipment, quality control procedures. (L17)

717-L. Metal Finishing in Canada. F. Campbell Rutherford. Paper from "International Review of Metal Finishing". Sawell Publications, Ltd., p. 57-59, 61, 63.

Production statistics. Developments in electroplating, anodizing, hot dipping and chemical and organic finishes. Table. (L general)

718-L. Recent Developments in Metal Finishing in Finland. Roy Kyrklund. Paper from "International Review of Metal Finishing". Sawell Publications, Ltd., p. 65 + 6 pages.

Trends in electroplating and organic finishing. Photographs. (L17, L26)

719-L. The Quality Control of Metallic Coatings in France. P. Morisset. Paper from "International Review of Metal Finishing". Sawell Publications, Ltd., p. 75-79, 82-84.

Establishment of standards for electroplated, anodized, sprayed metal and galvanized coatings. Standards define and classify different types of metal coating and set up various methods for controlling and measuring their thickness. Photographs, tables, graphs. (L17, L19, L23, L16, S22)

720-L. Recent Progress and Future Trends in German Electroplating and Metal Finishing. R. Springer. Paper from "International Review of Metal Finishing". Sawell Publications, Ltd., p. 87 + 15 pages.

Improvements in equipment, baths and operating procedures. Photographs. 20 ref. (L17)

721-L. Electroplating in Holland. Jules Odekerken. Paper from "International Review of Metal Finishing". Sawell Publications, Ltd., p. 109-111, 113.

Survey of preparatory treatment, equipment, baths. (L17)

722-L. Metal Finishing Trends in India. T. Banerjee. Paper from "International Review of Metal Finishing". Sawell Publications, Ltd., p. 115 + 8 pages.

Electroplating, anodizing, organic coatings. Photographs. (L17, L19, L26)

723-L. The Metal Finishing Industry in New Zealand. Stuart H. Wilson. Paper from "International Review of Metal Finishing". Sawell Publications, Ltd., p. 127 + 6 pages.

Present status and types of electroplating and other finishes. (L general)

724-L. Progress in Swedish Metal Finishing. H. C. Qvarnström. Paper from "International Review of Metal Finishing". Sawell Publications, Ltd., p. 137 + 5 pages.

Improvements in electroplating equipment and techniques. Photographs. (L17)

725-L. Electrodeposition in Switzerland at the Present Day. H. Reymond. Paper from "International Review of Metal Finishing". Sawell Publications, Ltd., p. 147 + 5 pages.

Survey of preparatory treatments and plating procedures. Photographs. (L17, L18)

726-L. Electroplating Developments in the United States. D. Gardner Foulke. Paper from "International Review of Metal Finishing". Sawell Publications, Ltd., p. 157 + 8 pages.

Improvements in equipment and processes. Waste treatment. Photographs. 94 ref. (L17, A8)

727-L. (German.) **Ematal Process of Surface Treatment.** W. W. G. Hübner. *Aluminium*, v. 30, no. 7, July 1954, p. 283-284.

Characteristics, methods of applying and examples of various applications of anodic oxidation in oxalic acid. Photographs. 4 ref. (L19, Al)

728-L. (German.) **Further Development of the Metal Spraying Technique.** Hans Reininger. *Metalloberfläche*, Ausgabe B, v. 6, no. 7, July 1954, p. 102-104.

Comparison of commercial processes. Photographs, micrographs, table. (To be continued.) (L23)

729-L. (German.) **Metallizing Nonconductors.** F. Elser. *Metalloberfläche*, Ausgabe A, v. 8, no. 7, July 1954, p. 107-110.

Chemical and mechanical methods of applying metals to plastics, glass, porcelain and wood. Tables, graph. (To be concluded.) (L general)

730-L. (German.) **Jigs and Fixtures for Hard Facing, by Deposition Welding, of Worn Parts of Brown-Coal Mining Machinery.** W. Prinz. *Schweissen und Schneiden*, v. 6, no. 7, July 1954, p. 296-298.

Equipment and techniques. Photographs, diagrams. (L24, ST)

731-L. (German.) **Chemical Polishing of Brass and Nickel Silver. I. Composition of the Polishing Bath. II. Microscopic Appearance of the Polished Surface.** Gerhard Schmid and Heinz Spähn. *Zeitschrift für Metallkunde*, v. 45, no. 6, June 1954, p. 392-401.

Effects of composition and temperature, methods of grading surface finish. Diagrams, graphs, micrographs. 7 ref. (L12, M27)

732-L. (Russian.) **Certain Problems in a Working Theory of Wheel Polishing.** G. B. Lur'e. *Vestnik Mashinostroeniia*, v. 34, no. 5, May 1954, p. 44-50.

Optimum times and conditions for various stages of polishing and finishing. Graphs, tables. (L10, ST)

733-L. (Russian.) **Selection of Rational Electrolysis Conditions for Production of Porous Chrome Plating.** G. K. Shvyriaev and M. A. Shluger. *Vestnik Mashinostroeniia*, v. 34, no. 5, May 1954, p. 64-68.

Influence of current density, temperature and composition of electrolyte. Table, micrographs, graphs. 5 ref. (L17, Cr, ST)

734-L. (Book.) **Chromium Plating.** P. Morisset, J. W. Oswald, C. R. Draper and R. Pinner. 611 p. 1954. Robert Draper Ltd., 83/85 Udney Park Road, Teddington, Middlesex, England. $11.

Production, properties and applications of all types of chromium electrodeposits. Includes auxiliary processes such as testing, grinding, polishing, solution analysis and health hazards. (L17, Cr)

735-L. (Book.) **International Review of Metal Finishing.** I. S. Hallows, editor. 171 p. 1954. Sawell Publications Ltd., 4 Ludgate Circus, London E.C.4, England. 10s/6d.

Twelve papers, separately abstracted, on trends in electroplating and coating industries of Canada, India, New Zealand, Europe and the United States. (L general)

M

Metallography, Constitution and Primary Structures

292-M. Diffuse X-Ray Scattering and the Physical Properties of Crystals. W. A. Wooster. *British Journal of Applied Physics*, v. 5, July 1954, p. 231-237.

Ionization and photographic methods of studying diffuse X-ray reflections. Diagrams, grating spectra. 22 ref. (M22)

293-M. An X-Ray Examination of the Indium-Rich Alloys of the Systems Indium + Lead and Indium + Mercury. C. Tyzack and G. V. Raynor. *Faraday Society, Transactions*, v. 50, July 1954, p. 675-684.

Lattice spacing relationships; changes in axial ratio; transformations from one structural type to another within very small ranges of composition. Tables, graphs, diagrams. 14 ref. (M24, Hg, Pb, In)

294-M. A Continuously Recording Electron Diffraction Camera for Studies of Crystal Structure Transitions. A. Boettcher, R. Thun, and H. Treupel. *Journal of Applied Physics*, v. 25, July 1954, p. 926-927.

Recording of rapid structure changes in solids caused by transformation and diffusion phenomena. Diagram, photograph. (M22)

295-M. Metallography. ASM Committee on Metallography. *Metal Progress*, v. 66, no. 1-A, July 15, 1954, p. 164-177.

Principles of the metallurgical microscope, phase contrast metallography, reflecting objectives, ultra-violet metallography, photomicrography in color, electrolytic polishing and etching, cathodic vacuum etching, and electron metallography. Diagrams, micrographs, graphs, tables. 41 ref. (M21)

296-M. X-Ray Measurements of Lattice Distortions in Martensite. (Digest of "Causes of the Weakening of the Intensity of X-Ray Interference of Martensite", by V. A. Il'ina, V. K. Kritskaya, and G. V. Kurdyumov; *Doklady Akademii Nauk SSSR*, v. 85, 1952, p. 773-775.) *Metal Progress*, v. 66, no. 1-A, July 15, 1954, p. A154, A156.

X-ray intensity measurements on quenched steels containing 0.35 and 0.41% carbon at 73 and −301° F. (M26, M22, CN)

297-M. Vacancies and Interstitials in Heat Treated Germanium. Sumner Mayburg. *Physical Review*, v. 95, ser. 2, July 1, 1954, p. 38-43.

Annealing experiments on the thermal acceptors quenched into germanium by rapid cooling from high temperature. Graphs, diagram. 21 ref. (M26, Ge)

298-M. Imperfections in Crystal Structure. Robert J. Maurer. *Record of Chemical Progress*, v. 15, no. 2, 1954, p. 61-67.

Discussion of atomic mobility in real crystals. Effect of dislocations on crystal properties. Diagrams, graph. 6 ref. (M26)

299-M. (German.) **Investigation of Electrolytic Copper Deposits With the Electron Microscope. "Aimed" Recordings.** A. Politycki. *Metall*, v. 8, nos. 13-14, July 1954, p. 526-527.

Preparation of samples and recording of specified areas. Photographs, micrographs. 4 ref. (M21, M27, Cu)

300-M. (Italian.) **The Hume-Rothery Phases in Systems With More Than Two Components. IV. The Nickel-Copper-Aluminum System. (7:4).** Francesco Mazzoleni. *Metallurgia italiana*, v. 46, no. 5, May 1954, p. 185-188.

Experimental study to determine existence of a ternary Hume-Rothery phase with 7:4 ratio. Spectrograph, diagrams, tables. 14 ref. (M24, Al, Cu, Ni)

301-M. (Russian.) **Variable Structures of Copper, Nickel, and Iron Alloys.** D. Balli and M. Zakharova. *Doklady Akademii Nauk SSSR*, v. 96, no. 3, May 21, 1954, p. 453-456.

Theoretical calculation of interference maxima for the deformed lattice. 3 ref. (M26, Cu, Ni, Fe)

302-M. (Russian.) **Structure of Spheroidal Graphite.** Iu. N. Taran. *Doklady Akademii Nauk SSSR*, v. 96, no. 3, May 21, 1954, p. 507-510.

Microscopic investigation of microsections of magnesium treated cast iron. Micrographs, table, diagrams. 5 ref. (M27, CI)

303-M. (Russian.) **Electronographic Investigation of Structures of Hexagonal Nitrides of Iron.** Z. G. Pinsker and S. V. Kaverin. *Doklady Akademii Nauk SSSR*, v. 96, no. 3, May 21, 1954, p. 519-522 + 1 plate.

Formation observed during nitriding of ferrous films in a flow of

ammonia at 250 to 650° C. Graphs, photographs. 7 ref. (M27, Fe)

304-M. (Russian.) **Structure and Homogeneity Limits of Tantalum Carbide.** V. I. Smirnova and B. F. Ormont. *Doklady Akademii Nauk SSSR*, v. 96, no. 3, May 21, 1954, p. 557-560.

X-ray and chemical analysis of initial and final products. Tables. 22 ref. (M26, M27, Ta)

305-M. (Russian.) **Investigation of the Structure and Properties of Cu-Ni-Fe Alloys.** D. Balli and M. I. Zakharova. *Doklady Akademii Nauk SSSR*, v. 96, no. 4, June 1, 1954, p. 737-740.

X-ray diffraction of powders. Measurement of coercivity and Curie point; changes in crystal lattice with annealing time. Graphs, tables. 2 ref. (M26, P16, Cu, Ni, Fe)

306-M. The Structure of Electrodeposits. J. J. Dale. *Metal Finishing*, v. 52, July 1954, p. 52-56, 59.

Defects, growth of deposits, effect of plating conditions on grain size. Micrographs. (To be continued.) (M27, L17)

307-M. Possible Macroscopic Effects of Single Lattice Defects. Jerome Rothstein. *Physical Review*, v. 95, ser. 2, July 15, 1954, p. 370-371.

Physical properties of crystals which are strongly anisotropic in the layered crystal may approach isotropicity in presence of spiral dislocations as intra-plane parameters can dominate interplane propagation. Table. 8 ref. (M26, M28)

308-M. (French.) **Influence of Impurity Distribution on Micrographic Behavior of Grain Boundaries and Subboundaries After Heat Treatment in Two Cases of Refined Aluminum.** Gérard Wyon and Jean-Mary Marchin. *Comptes rendus*, v. 238, no. 25, June 21, 1954, p. 2420-2422.

Test sheets were homogenized at 640° C. for 20 days and aged at temperatures between 250 and 600° C. for 20 hr. Micrographs. 3 ref. (M27, Al)

309-M. (Russian.) **X-Ray Investigation of Tin-Selenium, Zinc-Selenium, Cadmium-Selenium, and Silver-Selenium Alloys.** L. S. Palatnik and V. V. Levitin. *Doklady Akademii Nauk SSSR*, v. 96, no. 5, June 11, 1954, p. 975-978.

X-ray diffraction studies of vapor-deposited films after various annealing treatments. Table. 6 ref. (M22, J23, Sn, Zn, Ag, Cd, Se)

310-M. (German.) **The Structure of the Copper-Lead-Oxygen System.** Erich Gebhardt and Walter Obrowski. *Zeitschrift für Metallkunde*, v. 45, no. 6, June 1954, p. 332-338.

Results of thermal, microscopic, chemical and X-ray studies. Phase diagrams, micrographs, tables. 12 ref. (M24, Cu, Pb)

311-M. (German.) **The Copper-Lead-Oxygen System.** Wilhelm Hofmann and Jürg Kohlmeyer. *Zeitschrift für Metallkunde*, v. 45, no. 6, June 1954, p. 339-341.

Thermal and metallographic studies to establish equilibria points. Graphs, micrographs. 3 ref. (M24, Cu, Pb)

312-M. (German.) **Research on the Copper-Antimony System.** Konrad Schubert and Martin Ilschner. *Zeitschrift für Metallkunde*, v. 45, no. 6, June 1954, p. 366-370.

X-ray, dilatometric and metallographic studies of phases present. Tables, graphs, micrographs. 20 ref. (M24, Cu, Sb)

313-M. (German.) **Investigations of the Copper-Tellurium System.** Kurt Anderko and Konrad Schubert. *Zeitschrift für Metallkunde*, v. 45, no. 6, June 1954, p. 371-378.

X-ray, dilatometric and metallographic studies of phase boundaries. Graphs, tables, diagrams, micrographs. 17 ref. (M24, Cu, Te)

314-M. (Russian.) **Silver-Chromium Alloys.** A. T. Grigor'ev, E. M. Sokolovskaia and M. I. Kruglova. *Moscow Universiteta, Vestnik, Seriia Fiziko-Matematicheskikh i Estestvennykh Nauk*, v. 9, no. 5, May 1954, p. 77-81.

Thermal analyses, structure, mutual solubilities. Table, photographs, phase diagrams. (M24, Ag, Cr)

315-M. (Book.) **Microscopical Techniques in Metallurgy.** Henry Thompson. 160 p. Pitman Publishing Corp., 2 W. 45th St., New York 19, N. Y. $2.75.

Sampling and preparation of specimens. Describes the cheif features of the metallurgical microscope, reproduction of structure by photography and the use of color photography. Methods for determining graphite flake size and type in cast iron, inclusion ratings in steel and grain size. (M21)

316-M. (Book.) **The Structure of Metals and Alloys.** William Hume-Rothery and G. V. Raynor. 3rd Ed. 363 p. 1954. The Institute of Metals, 4 Grosvenor Garden, London S.W.-1, England. 35s.

Lattice parameters and interatomic distances in crystals. Structure of alloys of iron. Imperfections in crystals. (M26, Fe)

317-M. (Book.) **X-Ray Diffraction Procedures.** Harold P. Klug and Leroy E. Alexander. 716 p. 1954. John Wiley & Sons Inc., 440 Fourth Ave., New York 16, N. Y. $15.00.

Elementary crystallography, production and properties of X-rays, techniques and applications in research. (M22)

N

Transformations and Resulting Structures

309-N. Reactions at Solid Interfaces. F. C. Tompkins and D. A. Young. *The Chemical Society, Annual Reports*, v. 50, 1953, p. 70-80.

Current developments on solid decompositions. Nucleus formation and growth; decompositions of specific compounds. 117 ref. (N2, N3, P13)

310-N. Anisothermal Decomposition of Austenite in a Medium-Alloy Steel. P. T. Moore. *Iron and Steel Institute, Journal*, v. 177, July 1954, p. 305-311.

Studies were made by the "step-quench" and continuous-cooling methods to check validity of the Scheil "fractional nucleation" theory and its modifications. Graphs, tables. 16 ref. (N8, AY)

311-N. Carbides in 310 Stainless Steel. I. Hiram Brown. *Steel*, v. 135, July 19, 1954, p. 106-108.

Formation of chromium carbide networks around grain boundaries during rolling or fabrication. Effects on cracking during hot working. Micrographs, tables. (N8, F23, SS)

312-N. (French.) **Formation of Carbides in Bainitic Transformation of Steel.** Jacques Pomey. *Comptes rendus*, v. 238, no. 24, June 14, 1954, p. 2318-2320.

Effect of speed of isothermal decomposition of austenite into bainite. Graphs. 1 ref. (N8, ST)

313-N. (French.) **The Effect of Carbon on the S-Curves of Steels of the CD4 Type.** G. Meynet. *Revue de métallurgie*, v. 51, no. 6, June 1954, p. 365-378.

Dilatometric and micrographic studies of low-alloy steels. Table, graphs, micrographs. (N8, AY)

314-N. (French.) **The Thermodynamics of Austenite-Martensite Transformation in Iron-Carbon Alloys.** O. Krisement, E. Houdremont, and F. Wever. *Revue de métallurgie*, v. 51, no. 6, June 1954, p. 401-409; disc. p. 410.

Formation of martensite studied to determine persistence of austenite. Graphs, diagram. 9 ref. (N8, P12, ST)

315-N. (French.) **The Diffusion of Addition Elements, in Particular of Copper, Into the Coating of Clad Light Alloys.** M. Renouard. *Revue de métallurgie*, v. 51, no. 6, June 1954, p. 419-424.

Diffusion of copper into coatings of clad duralumin determined spectrographically. Graphs, micrographs. (N1, L22, Cu, Al)

316-N. (French.) **Study of Transformations Occurring During the Tempering of High Speed Steel.** A. H. Michel and J. Papier. *Revue de métallurgie*, v. 51, no. 6, June 1954, p. 425-433; disc., 434.

Causes of contractions observed at 80 to 160° C. and 260 to 360° C. Graphs. 17 ref. (N8, TS)

317-N. (German.) **Effect of Antimony on the Attack of Iron by Molten Zinc Saturated With Iron.** Dietrich Horstmann. *Archiv für das Eisenhüttenwesen*, v. 25, nos. 5-6, May-June 1954, p. 207-213.

Experiments reveal that laws which apply to pure zinc-iron diffusion apply also to alloys. Tables, graphs, micrographs. 6 ref. (N1, R6, Sb, Fe, Zn)

318-N. (German.) **The Particle Size of Iron Nitride Precipitated From an Alpha-Iron Supersaturated With Carbon and Nitrogen.** Werner Köster and Lothar Bangert. *Archiv für das Eisenhüttenwesen*, v. 25, nos. 5-6, May-June 1954, p. 231-238; disc., p. 238-240.

Effect of temperature, rate of cooling, and annealing. Graphs, micrographs, diagrams. 24 ref. (N7, Fe)

319-N. (German.) **The Precipitation of Carbon in Alpha-Iron During Aging.** Winfrid Dahl and Kurt Lücke. *Archiv für das Eisenhüttenwesen*, v. 25, nos. 5-6, May-June 1954, p. 241-249; disc., p. 249-250.

Electrical resistance of undeformed and elongated carbonyl iron wire as functions of aging temperature and time. Graphs, tables. 30 ref. (N7, P15, Fe)

320-N. (German.) **The Decomposition of Austenite in Hypereutectoid Manganese Steels.** Werner Jellinghaus, Adolf Rose, and Hans Holetzko. *Archiv für das Eisenhüttenwesen*, v. 25, nos. 5-6, May-June 1954, p. 251-261; disc., p. 261-262.

Determination of isotherms of resistance and magnetization, lattice parameters, and nucleation experiments. Graphs, tables, micrographs. 36 ref. (N8, AY)

321-N. (German.) **Basic Considerations on the Transformations of Austenite in the Pearlite and Intermediate Stage.** Werner Jellinghaus and Eduard Houdremont. *Archiv für das Eisenhüttenwesen*, v. 25, nos. 5-6, May-June 1954, p. 263-269; disc., p. 269-270.

Effect of carbon diffusion, carbide formation, and diffusionless transformation. Graphs, micrograph. 27 ref. (N8, AY)

322-N. (German.) **The Effect of Different Elements on Graphitization and Its Spectroscopic Investigation.** K.

Roesch. *Giesserei*, v. 41, no. 13, June 24, 1954, p. 338-340.

Effects of various inclusions in cast iron. Tables, spectrographs. 9 ref. (N8, CI)

323-N. (Russian.) **Effect of Interstitial Atoms on Self-Diffusion of Metals.** M. A. Krivoglaz and A. A. Smirnov. *Doklady Akademii Nauk SSSR*, v. 96, no. 3, May 21, 1954, p. 495-498.

Theoretical explanation of experimental results obtained by Gruzin, Kornev, and Krudiumov. Graphs. 5 ref. (N1)

324-N. (Russian.) **Problem of Solution of Metals in Their Chlorides.** G. G. Urazov and A. S. Karnaukhov. *Doklady Akademii Nauk SSSR*, v. 96, no. 3, May 21, 1954, p. 535-538.

Thermal analysis of lead-lead chloride and cadmium-cadmium chloride. Tables, graphs. 3 ref. (N12, Pb, Cd)

325-N. (Russian.) **Reversibility of Martensitic Transformations During Heating of Iron-Carbon Alloys.** V. N. Gridnev and V. I. Trefilov. *Doklady Akademii Nauk SSSR*, v. 96, no. 4, June 1, 1954, p. 741-743.

Relation of phase transformation to rate of heating. Position of critical point for normalized and tempered steels. Graphs. 7 ref. (N8, ST)

326-N. ABC of Foundry Practice. Fundamentals of Metal Solidification. T. H. Trevithick. *Foundry*, v. 82, Aug. 1954, p. 224, 226, 228.

Solid solutions and mechanical mixtures. Graphs. (N12)

327-N. Carbides in 310 Stainless Steel. II. Hiram Brown. *Steel*, v. 135, July 26, 1954, p. 92-94.

Conditions that cause severe carbide precipitation include annealing temperatures of less than 2050° F. and slow cooling from heat treating temperature. Photographs, micrographs. (N8, SS)

328-N. (French.) **Influence of Deformation in Secondary Recrystallization of Soft Iron.** Roger Guihaumé. *Comptes rendus*, v. 238, no. 25, June 21, 1954, p. 2418-2420.

Orientations and dimensions of secondary crystals vary with rate or cold working. Micrographs. 2 ref. (N5, Fe)

329-N. (French.) **Isothermal Transformations and Heat Treatments of Copper and Nickel-Chromium Cast Irons.** J. van Eeghem, J. Vidts and A. De Sy. *Fonderie*, 1954, June, no. 101, p. 3973-3988; disc., p. 3988.

Methods for determining transformation curves. Tables, graphs, photographs, micrographs. 7 ref. (N8, J28, CI)

330-N. (German.) **Decomposition of the Wustite Phase.** L. Castelliz, W. De Sutter and F. Halla. *Monatshefte für Chemie*, v. 85, no. 3, June 1954, p. 487-490.

Experiments show that significant amounts of Fe_3O_4 are formed at 190° C. on sheet iron heated in air. 2 ref. (N8, Fe)

331-N. (French.) **Effect of Interstitial Elements on Allotropic Transformation of Cobalt.** Jean Drain, Raymond Bridelle and André Michel. *Bulletin de la société chimique de France*, 1954, no. 6, June, p. 828-830.

Thermal analysis and X-rays reveal effect of hydrogen, nitrogen and carbon on temperature and hysteresis of transformation. Graphs, tables. 20 ref. (N6, Co)

332-N. (French.) **X-Ray Study of Reversion Phenomena in Aluminum-Copper Alloy With 4% Copper.** René Graf and André Guinier. *Comptes rendus*, v. 239, no. 1, July 5, 1954, p. 52-54.

Modified kinetics after rehardening. Study of monocrystalline structures. Effect of reversion on zones and phases. Table. (N6, Al, Cu)

333-N. (French.) **Allotropic Transformation of Cobalt.** Hervé Bibring and Francois Sebilleau. *Comptes rendus*, v. 239, no. 1, July 5, 1954, p. 54-56.

X-ray study. Effect of reheating on cubic and hexagonal phases. Micrographs. (N6, Co)

334-N. (German.) **Preferred Direction of Surface Diffusion on the Surfaces of Monocrystals.** Michael Drechsler. *Zeitschrift für Elektrochemie*, v. 58, no. 5, July 1954, p. 334-339.

Theoretical determination and electron microscopic study on adsorption of barium on tungsten and tungsten on tungsten. Photographs, diagrams. 14 ref. (N1, Ba, W)

335-N. (German.) **Measuring Surface-Diffusion Coefficients and Exchange Energies of Barium on the Surfaces of Monocrystalline Tungsten With the Field-Electron Microscope.** Michael Drechsler. *Zeitschrift für Elektrochemie*, v. 58, no. 5, July 1954, p. 340-345.

Experimental values agree with theoretical determinations. Photographs, diagram, graph, tables. 12 ref. (N1, Ba, W)

336-N. (German.) **Explanation of the Diffusion Process in the Copper-Nickel System.** Wolfgang Seith and Rudolf Ludwig. *Zeitschrift für Metallkunde*, v. 45, no. 6, June 1954, p. 401-407.

Diffusion during welding and in the vapor phase. Study of secondary phenomena. Micrographs, graphs, diagram. 11 ref. (N1, Cu, Ni)

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Physical Properties and Test Methods

435-P. An Electrochemical and Structural Investigation of the Processes Occurring at Silver Anodes in Sulphuric Acid. P. Jones and H. R. Thirsk. *Faraday Society, Transactions*, v. 50, July 1954, p. 732-739 + 1 plate.

Behavior of silver on anodic polarization in 2*N* sulfuric acid was found to resemble closely that of lead in the same electrolyte. Graphs, micrographs, table. 10 ref. (P15, Ag)

436-P. The Melting Point of Titanium. T. H. Schofield and A. E. Bacon. *Industrial Heating*, v. 21, July 1954, p. 1348, 1400.

Condensation of a paper presented before the British Institute of Metals. Apparatus and experimental procedure. Indicated melting point was 3020 ± 18° F. (P12, Ti)

437-P. Contact Charging Between Nonconductors and Metal. John W. Peterson. *Journal of Applied Physics*, v. 25, July 1954, p. 907-915.

Charging of fused quartz and borosilicate glass spheres rolling on a clean nickel surface. Diagrams, graphs. 4 ref. (P15, Ni)

438-P. Thermomagnetic Properties of Thin Metallic Films. F. J. Blatt. *Physical Review*, v. 95, ser. 2, July 1, 1954, p. 13-15.

Calculation of Sondheimer on the galvanomagnetic effects in thin metallic films is extended so as to permit the evaluation of the Nernst, Ettinghausen, and Leduc-Righi coefficients. 6 ref. (P16)

439-P. Theory of the Galvanomagnetic Effects in Germanium. B. Abeles and S. Meiboom. *Physical Review*, v. 95, ser. 2, July 1, 1954, p. 31-37.

Attempts to explain observed magnetoresistance effects by assuming a simple anisotropic model, in which the energy surfaces in momentum space have a number of extrema. Tables, graphs. 12 ref. (P15, M26, Ge)

440-P. Some Properties of *p*-Type Gallium Antimonide Between 15° K and 925° K. H. N. Leifer and W. C. Dunlap, Jr. *Physical Review*, v. 95, ser. 2, July 1, 1954, p. 51-56.

Temperature variation of some of the conduction properties of single crystals. Graphs. 16 ref. (P15, Ga, Sb)

441-P. Theory of Secondary Electron Cascade in Metals. P. A. Wolff. *Physical Review*, v. 95, ser. 2, July 1, 1954, p. 56-66.

Diffusion, energy loss, and multiplication of secondary electrons within a metal. Table, graphs. 13 ref. (P10, Al, Cu, Li, Ag)

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Results of investigation of iron and nickel monocrystals, cobalt ferrites, and mixed ferrite of manganese and zinc. Tables, graphs, diagrams. 25 ref. (P16, Fe, Ni, Co, Mg, Zn)

443-P. (French.) **Complex Initial Magnetic Permeability of Iron From 0 to 7000 Mc.** Jean Benoit and Ernst Naschke. *Comptes rendus*, v. 238, no. 24, June 14, 1954, p. 2292-2294.

With large domains the magnetic dispersion attributable to dynamics of boundaries takes place at rather low frequencies. Graphs. 2 ref. (P16, Fe)

444-P. (French.) **Anisotropy in the Effect of Elastic Deformations on the Superconductivity of Tin.** Claude Grenier. *Comptes rendus*, v. 238 no. 24, June 14, 1954, p. 2300-2303.

Effect of elastic compression and tension. Graph, table. 5 ref. (P15, Sn)

445-P. (German.) **Errors of Measuring Magnetic Reversal Losses of Electric Sheets on Epstein and Ring Test Specimens.** Robert Ochsenfeld. *Archiv für das Eisenhüttenwesen*, v. 25, nos. 5-6, May-June 1954, p. 293-297; disc., p. 297-298.

Nonuniform magnetization of specimens makes testing and comparison difficult. Diagrams, graphs, tables, photographs. 13 ref. (P15, P16, ST)

446-P. (German.) **Influencing Conductivity of Highly Pure Copper by Admixtures.** O. Kayser, F. Pawlek, and K. Reichel. *Metall*, v. 8, nos. 13-14, July 1954, p. 532-537.

Effect of soluble and insoluble impurities, compressive stresses, sintering conditions, and recovery on conductivity. Graphs, diagrams, tables. 66 ref. (P15, Cu)

447-P. (Russian.) **Latent Deformation Energy of Metals at Low Temperature.** V. I. Khotkevich, E. F. Chalkovskii, and V. V. Zashkvara. *Doklady Akademii Nauk SSSR*, v. 96, no. 3, May 21, 1954, p. 483-486.

Method and results of investigations of cadmium and tin at liquid nitrogen temperature and copper at room temperature. Graphs. 12 ref. (P12, Cd, Sn, Cu)

448-P. (Russian.) **Nonequilibrium Character of Energy Distribution in an Electric Discharge and Chemical Reactions.** K. N. Mochalov. *Doklady Akademii Nauk SSSR*, v. 96, no. 3, May 21, 1954, p. 553-556.

Temperature measurements of various discharge regions of copper electrodes by spectroscopic methods. 15 ref. (P13, P15, Cu)

449-P. (Russian.) **Paramagnetic Relaxation in Metals.** S. V. Vonsovskii and S. G. Salikhov. *Doklady Akademii Nauk SSSR*, v. 96, no. 4, June 1, 1954, p. 717-719.

Paramagnetic absorption of energy of a high-frequency field. Two periods of relaxation. Graphs. 6 ref. (P16, Cr, W, Ru, Rh)

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Effect of magnitude of magnetic induction sheet thickness, and distribution of eddy currents. Graphs. 2 ref. (P10, Al)

451-P. (Russian.) **Some Metallurgical Equilibria With Participation of Acid Slags.** V. A. Kozheurov and D. M. Laptev. *Zhurnal Fizicheskoi Khimii*, v. 28, no. 5, May 1954, p. 814-823.

Distribution of oxygen between metals and acid slags. Solubility of silica. Equation for free energy of five-component slag. Tables, graphs. 9 ref. (P12, B21, Fe)

452-P. (Russian.) **Error in Fusion Viscosity Measurement Due to Thermal Expansion of Platinum Spheres of Torsion Viscosimeters.** V. T. Slavianskii and N. G. Gutkina. *Zhurnal Fizicheskoi Khimii*, v. 28, no. 5, May 1954, p. 851-855.

Correction formulas. Graphs, table, diagrams. 4 ref. (P10, P11, Pt)

453-P. Threshold Field Properties of Some Superconductors. E. Maxwell and O. S. Lutes. *Physical Review*, v. 95, ser. 2, July 15, 1954, p. 333-338.

Some refined measurements of critical field curves for tin, thorium, indium and mercury compared with specific predictions of the Gorter-Casimir and Koppe versions of the two-fluid model of super-conductivity. Tables, graphs. 8 ref. (P15, Sn, Th, In, Hg)

454-P. Some Properties of Germanium-Silicon Alloys. Everett R. Johnson and Schuyler M. Christian. *Physical Review*, v. 95, ser. 2, July 15, 1954, p. 560-561.

Variation of physical constants with composition. Graphs, table. (P general, Ge, Si)

455-P. Magnetic Domains in Cobalt by the Longitudinal Kerr Effect. Charles A. Fowler, Jr., and Edward M. Fryer. *Physical Review*, v. 95, ser. 2, July 15, 1954, p. 564-565.

Technique for examining small domains usually encountered in ordinary ferromagnetic crystals. Photographs. 5 ref. (P16, Co)

456-P. The Mechanical Properties of Crystalline Metal Surfaces. A. J. Shaler. Paper from "Structure and Properties of Solid Surfaces". Univ. of Chicago Press, p. 120-138; disc., p. 138-146.

Various experimental measurements of surface tension and energy. Reviews nature and characteristics of concepts of surface tension and energy and of associated surface energies. Diagram, graph. 74 ref. (P10, P12)

457-P. (French.) **Effect of Condensation Surface Temperature on Values of Condensation Coefficients of Molecular Jets of Antimony and Gold.** Marcel Devienne. *Comptes rendus*, v. 238, no. 25, June 21, 1954, p. 2397-2399.

Results at various temperatures. 2 ref. (N16, Sb, Au)

458-P. (French.) **Influence of the Thickness of Weiss Domains on Permeability of Iron Between 0 and 7000 Mc.** Jean Benoit and Ernst Naschke. *Comptes rendus*, v. 238, no. 25, June 21, 1954, p. 2404-2405.

Armco iron annealed for 5 hr. in purified hydrogen at temperatures up to 1220° C. Graphs. 1 ref. (P16, Fe)

459-P. (French.) **Theory of Electrolytic Conductivity. II.** T. G. Owe Berg. *Journal de chimie physique*, v. 51, no. 4, Apr. 1954, p. 161-164.

Kinetics of reactions and process controlling rates; processes at the electrodes; molecular bonds. 7 ref. (P15)

460-P. (German.) **Entropy of Melting and Resistance Ratio at the Melting Point of Certain Multivalent Metals.** A. Knappwost. *Monatshefte für Chemie*, v. 85, no. 3, June 1954, p. 548-557.

Data from tests on zinc, lead and aluminum agree with calculations based on the electron theory of metals. Diagrams, graphs. 12 ref. (P12, Zn, Pb, Al)

461-P. (German.) **Influence of Special Lattice Disturbances on the Electrical Properties of Germanium.** K. Blank, D. Geist and K. Seiler. *Zeitschrift für Naturforschung*, v. 9a, no. 6, June 1954, p. 515-520.

Impurities account for most effects commonly ascribed to disturbances. Graphs, diagrams, photograph. 19 ref. (P15, Ge)

462-P. (German.) **Electrical Properties of Indium Antimonide. II.** O. Madelung and H. Weiss. *Zeitschrift für Naturforschung*, v. 9a, no. 6, June 1954, p. 527-534.

Specific conductivity and Hall constant of InSb from −220 to 470° C. Diagram, graphs. 17 ref. (P15, In, Sb)

463-P. The Electrochemical Polarization of Zirconium in Neutral Salt Solutions. Norman Hackerman and Olin B. Cecil. *Electrochemical Society, Journal*, v. 101, Aug. 1954, p. 419-425.

Cathodic and anodic polarization curves in neutral sodium chloride at constant current densities between 3.5×10^{-8} and 3.5×10^{-3} amp. per sq. cm^2. Graphs. 7 ref. (P15, R5, Zr, Hf)

464-P. Hydrogen Overvoltage on Bright Platinum. II. pH and Salt Effects in Acid, Neutral, and Alkaline Solutions. Sigmund Schuldiner. *Electrochemical Society, Journal*, v. 101, Aug. 1954, p. 426-432.

Mechanism and measurement over the pH range 0.5 to 12.1. Graphs, table, diagram. 8 ref. (P15, Pt)

465-P. An Experimental Confirmation of the Drude Free Electron Theory of the Optical Properties of Metals for Silver, Gold, and Copper in the Near Infrared. L. G. Schulz. *Optical Society of America, Journal*, v. 44, July 1954, p. 540-545.

Optical constants n and k determined from reflectivity and from transmissivity measurements in wave length range of 1μ to 3μ. Graphs, diagram, tables. 26 ref. (P17, Ag, Au, Cu)

466-P. (French.) **Paramagnetic and Thermal Study of the Heusler MnSnCu₂ Alloy.** Pierre Taglang and Georges Asch. *Comptes rendus*, v. 238, no. 26, June 28, 1954, p. 2500-2502.

Superstructure below melting point and strong discontinuity of paramagnetic properties accompanying melting. Two transformations and their relation to differences in ferromagnetism. Graphs. 3 ref. (P16, M27, Mn, Sn, Cu)

467-P. (French.) **Interpretation of Magnetic Properties of Rare Earth Ferrites.** Louis Néel. *Comptes rendus*, v. 239, no. 1, July 5, 1954, p. 8-11.

Decomposition of primary lattice into a ferromagnetic sublattice bound to a paramagnetic sublattice of rare-earth ions. Effect of temperature on paramagnetic sublattice. 9 ref. (P16, EG-g)

468-P. (French.) **Hysteresis Phenomena Presented by Rectifier Contacts and Thin Layers.** Nicolas Nifontoff. *Comptes rendus*, v. 239, no. 1, July 5, 1954, p. 31-33.

Diffusion of impurity ions in metal-semiconductor barriers under applied potential differences. Graphs. 5 ref. (P16)

469-P. (French.) **Thermomagnetic Study of Gadolinium Ferrite.** René Pauthenet and Pierre Blum. *Comptes rendus*, v. 239, no. 1, July 5, 1954, p. 33-35.

Measurement, by axial extraction method, of specific magnetism from 4 to 700° C. Graph. 7 ref. (P16, Fe, Gd)

470-P. (German.) **The Conductivity of Silicon.** W. Heywang, M. Zerbst and F. Bischoff. *Naturwissenschaften*, v. 41, no. 13, July 1954, p. 301-302.

Data for tests up to 500° C. Graph. 3 ref. (P11, Si)

471-P. (German.) **Computation of the Energies of Adsorption and Exchange on the Surfaces of Monocrystalline Metals.** Michael Drechsler. *Zeitschrift für Elektrochemie*, v. 58, no. 5, July 1954, p. 327-334.

Energies depend on ratios of atomic radii. Effects of specific surface energies on sorbent distribution. Tables, photographs, graphs. 22 ref. (P13)

472-P. (German.) **Property Changes During the Hardening of a Copper-Chromium Alloy.** Werner Köster and Willy Knorr. *Zeitschrift für Metallkunde*, v. 45, no. 6, June 1954, p. 350-356.

Effects of hardening temperature on mechanical and electrical properties and on amount of segregation. Graphs, table. 15 ref. (P15, Q general, J26, Cu, Cr)

473-P. (German.) **The Effect of Oxygen on the Surface Behavior of Copper.** Friedrich Erdmann-Jesnitzer and Fritz Günther. *Zeitschrift für Metallkunde*, v. 45, no. 6, June 1954, p. 407-412.

Effects of temperature on vapor and dissociation pressures of copper and its oxides. Micrograph, photograph, graph, diagrams. 21 ref. (P12, Cu)

474-P. (German.) **An Irreversible Change in the Remanence of Plastically Elongated Nickel.** L. Reimer. *Zeitschrift für Physik*, v. 137, no. 5, 1954, p. 588-594.

Theoretical effects of internal stresses confirmed by thermal recovery and reversible change in remanence by cooling nickel to the temperature of liquid air. Graphs. 11 ref. (P16, Ni)

475-P. (Russian.) **Magneto-Acoustic Effect in Para and Dia-Magnetic Metals.** L. L. Miasnikov and G. K. Ul'ianov. *Doklady Akedemii Nauk SSSR*, v. 96, no. 5, June 11, 1954, p. 967-969.

Increased frequency of torsional sound waves and increase of absorption. Graphs. (P16, Al, Cu, Mg)

NATIONAL METAL CONGRESS
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Q Mechanical Properties and Test Methods; Deformation

753-Q. Elastic and Anelastic Behavior of Some Metals at Very Low Temperatures. Piero Giorgio Bordoni. *Acoustical Society of America, Journal*, v. 26, July 1954, p. 495-502.

Vibration frequency and damping have been measured as a function of temperature from 4.5-300 K, for lead, copper, aluminum, and silver rods. Tables, diagrams, photographs, graphs. 8 ref.
(Q21, Q22, Pb, Cu, Al, Ag)

754-Q. Flexure-Torsion Failure of Panels. John H. Argyris. *Aircraft Engineering*, v. 26, July 1954, p. 213-219.

Study of instability and failure of stiffened panels under compression when buckling in long wavelengths. Graphs, table, diagrams. (Q1)

755-Q. An Appraisal of the Prot Method of Fatigue Testing. H. T. Corten, T. Dimoff and T. J. Dolan. *American Society for Testing Materials, Preprint no.* 69, 1954, 20 p.

Compares experimental results for three ferrous metals and an aluminum alloy with conventional fatigue data. Graph, tables. 17 ref.
(Q7, Al, AY)

756-Q. An Experimental Study of the Influence of Fluctuating Stress Amplitude on Fatigue Life of 75S-T6 Aluminum. H. T. Corten, G. M. Sinclair, and T. J. Dolan. *American Society for Testing Materials, Preprint no.* 70, 1954, 16 p.

Pattern of fluctuating stress consisted of repeated blocks of 10,000 cycles during which a minor or low stress amplitude was applied during the initial portion and a major or high stress amplitude was applied during the remainder of the cycles in each repeated block. Diagrams, tables, graphs. 15 ref.
(Q7, Al)

757-Q. Dynamic Creep and Rupture Properties of an Aluminum Alloy Under Axial Static and Fatigue Stress. F. W. DeMoney and B. J. Lazan. *American Society for Testing Materials, Preprint no.* 71, 1954, 14 p.

Fatigue, stress-rupture, and creep data obtained under various combinations of mean and alternating axial stress for rolled 24S-T4 at 300 and 500° F. Graphs. 8 ref.
(Q3, Q4, Q7, Al)

758-Q. Fatigue Strength of 14S-T4 Aluminum Alloy Subjected to Biaxial Stresses. R. W. Bundy and Joseph Marin. *American Society for Testing Materials, Preprint no.* 73, 1954, 12 p.

Influence of biaxial tension-tension and tension-compression stresses. Diagrams, photographs, graph. 13 ref. (Q7, Al)

759-Q. Softening of Certain Cold-Worked Metals Under the Action of Fatigue Loads. N. H. Polakowski and A. Palchoudhuri. *American Society for Testing Materials, Preprint no.* 74, 1954, 12 p.

The belief that fatigue of ductile metals is associated with progressive strain hardening is not true for initially cold worked metals. Tables, graphs. 22 ref.
(Q7, Al, Cu, Ni)

760-Q. A Simplified Statistical Procedure for Obtaining Design-Level Fatigue Curves. E. H. Schuette. *American Society for Testing Materials, Preprint no.* 75, 1954, 12 p.

Suggests a procedure that will provide design-level curves with only a fraction of testing time required for obtaining complete statistical data, and without mathematics. Diagrams, tables, graphs. 8 ref. (Q7)

761-Q. A Failure Criterion for Multi-Axial Fatigue Stresses. F. B. Stulen and H. N. Cummings. *American Society for Testing Materials, Preprint no.* 76, 1954, 14 p.

Relation is developed for predicting fatigue in polycrystalline metals subjected to any combination of steady and vibratory multi-axial stresses. Diagrams, tables. 16 ref. (Q7)

762-Q. Poisson Effect in the Charpy Test. Carl E. Hartbower. *American Society for Testing Materials, Preprint no.* 77, 1954, 8 p.

Significance and measurement of the Poisson effect in the V-notch and keyhole Charpy tests. Graphs. 3 ref. (Q6, CN)

763-Q. Notch-Bar Tests of High-Strength Steel. R. Raring and J. Rinebolt. *American Society for Testing Materials, Preprint no.* 80, 1954, 7 p.

Charpy V-notch specimens of AISI 4340 steel heat treated to 210,000 psi. and 230,000 psi. were tested from 320 to −320° F. by the conventional impact test and by slow bending. Graphs, photographs.
(Q5, Q6, AY)

764-Q. Size Effect in the Tension Test of Mild Steel. Cedric W. Richards. *American Society for Testing Materials, Preprint no.* 84, 1954, 6 p.

Demonstrates a definite dependence of the upper yield point of mild steel on specimen size. Graph, table. 7 ref. (Q27, CN)

765-Q. A New Triaxial Stress Testing Machine for Determining Plastic Stress-Strain Relations. H. A. B. Wiseman and Joseph Marin. *American Society for Testing Materials, Preprint no.* 85, 1954, 17 p.

Stresses applied consist of two equal compressive principal stresses with the third principal stress either tension or compression. These triaxial stresses are produced by subjecting a cylindrical specimen to radial hydraulic pressure and axial tension or compression. Diagrams, graphs, photographs. 6 ref.
(Q25, Al)

766-Q. An Inexpensive Constant-Load Testing Machine. M. E. Clark and O. M. Sidebottom. *American Society for Testing Materials, Preprint no.* 85A, 1954, 4 p.

Design and features of machine for application and maintenance of constant loads. Diagram, graphs, table. (Q27)

767-Q. Piles Subjected to Lateral Thrust. I. Measurement of Earth Pressure and Deflection Along the Embedded Portion of a 40-Ft. Steel Pile. H. G. Mason and J. A. Bishop. **II. Analysis of Pressure Deflection, Moment, and Shear by the Method of Difference Equations.** L. A. Palmer and P. P. Brown. *American Society for Testing Materials, Preprint no.* 95-96, 1954, 30 p.

In-place properties of deep soil deposits in relation to pile foundations. Tables, graphs, diagram, photographs. 7 ref. (Q2)

768-Q. Constant and Cyclic-Load Creep Tests of Several Materials. Ward F. Simmons and Howard C. Cross. *American Society for Testing Materials, Preprint no.* 100d, 1954, 13 p.

Tests were made on sheet specimens of 24S-T3 and 24S-T81 aluminum alloys at 300° F., SAE 4130 steel at 800° F., and AISI 310 stainless steel at 1500° F. Tables, graphs. (Q3, Al, SS, AY)

769-Q. Creep Properties of Annealed Unalloyed Zirconium. M. J. Manjoine and W. L. Mudge, Jr. *American Society for Testing Materials, Preprint no.* 106a, 1954, 18 p.

Effect of state of anneal on creep. Tables, graphs, diagram, photographs. 11 ref. (Q3, Zr)

770-Q. The Creep Characteristics of Copper-Nickel Alloys at 300, 400, and 500 F. J. H. Port and A. I. Blank. *American Society for Testing Materials Preprint no.* 106b, 1954, 12 p.

Alloys tested were 90-10 copper-nickel containing 0.68% iron, 90-10 copper-nickel containing 1.08% iron, and 80-20 copper-nickel containing 0.19% iron. Micrographs, tables, graphs. 6 ref. (Q3, Cu, Ni)

771-Q. New Methods in the Analysis and Design of Structures in the Plastic Range. J. F. Baker and M. R. Horne. *British Welding Journal*, v. 1, July 1954, p. 307-315. (From *Revue Universelle des Mines*, v. 9, 1953, p. 326-336.)

Previously abstracted from original. See item 807-Q, 1953. (Q23)

772-Q. Design Stresses in Light-Alloy Rolling Stock. Wide Margin of Safety in Fatigue. R. Chadwick. *Engineering*, v. 178, July 9, 1954, p. 43-46.

Mechanical properties of aluminum alloys. Design factors including stresses and fatigue characteristics. Graphs, tables. 5 ref.
(Q7, Q25, Al)

773-Q. Test New Alloy Steel for Pressure Vessels. *Iron Age*, v. 174, July 22, 1954, p. 120.

Burst and drop weight tests on tanks built of Carilloy T-1 steel and designed on basis of yield strength rather than ultimate strength.
(Q23, AY)

774-Q. Strength Under Combined Tension and Bending in the Plastic Range. J. M. Frankland and R. E. Roach. *Journal of the Aeronautical Sciences*, v. 21, July 1954, p. 449-453, 474.

Analysis of bars of rectangular section. Graphs. 7 ref. (Q23, Al)

775-Q. The Strength of Short Cylinders Under Internal Pressure. D. G. Christopherson and G. R. Higginson. *Journal of the Mechanics and Physics of Solids*, v. 2, June 1954, p. 217-237 + 1 plate.

Method of estimating internal pressure required to cause plastic expansion of a uniform circular tube. Tables, graphs, diagram, photograph. 8 ref. (Q23, ST)

776-Q. An Experimental Investigation of Residual Stresses in Hollow Cylinders Due to the Creep Produced by Thermal Stresses. Y. G. Attia, D. Fitzgeorge and J. A. Pope. *Journal of the Mechanics and Physics of Solids*, v. 2, June 1954, p. 238-258 + 1 plate.

A series of thick hollow cylinders were subjected to a radial flow of heat by heating the bore and water-cooling the outer diameter for a chosen period of time, during which the thermal stresses were relaxed by creep. Diagrams, graphs, tables, photograph. (Q25, Q3, CI)

777-Q. Yield Criteria and the Bending of Wide Beams. D. A. Barlow. *Journal of the Mechanics and Physics of Solids*, v. 2, June 1954, p. 259-264 + 1 plate.

Ductility of aluminum alloys in bending. Graphs, photograph. 4 ref.
(Q23, Q5, Al)

778-Q. On the Limits Set by Plastic Yielding to the Intensity of Singularities of Stress. R. Hill. *Journal*

of the Mechanics and Physics of Solids, v. 2, June 1954, p. 278-285.

Deformation of a solid body under conditions of local stress. Diagrams. 10 ref. (Q25)

779-Q. Heat-Resisting Alloys. ASM Committee on Heat-Resisting Alloys. *Metal Progress*, v. 66, no. 1-A, July 15, 1954, p. 42-48.

Compositions and mechanical properties. Elevated-temperature tests, their limitations, and application to design and selection of heat resisting alloys. Graphs, tables. (Q23, SG-h)

780-Q. Engine Metals and Engine Wear. ASM Committee on Engine Metals. *Metal Progress*, v. 66, no. 1-A, July 15, 1954, p. 91-96.

Stresses and factors that influence wear of various engine parts. Selection of bearing and wear resisting metals. Graphs, diagrams, micrographs, tables. (Q9, T25, SG-e, m)

781-Q. Effect of Stress Concentration on Design Strength. ASM Committee on Stress Concentration. *Metal Progress*, v. 66, no. 1-A, July 15, 1954, p. 97-103.

Service failures from stress concentration. Definitions and basic concepts. Application to design. Notch sensitivity. Combined steady and alternating stress components. Notch effect for a limied number of cycles. Reducing effects of stress concentration. Photographs, diagrams, graphs. 39 ref. (Q25, Q7)

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Studies of the fundamental factors responsible for high-temperature strength. (Q23)

783-Q. An Investigation of the Creep Lifetime of 75S-T6 Aluminum-Alloy Columns. Eldon E. Mathauser and William A. Brooks, Jr. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3204, July 1954, 28 p.

Results of static-strength and creep tests. Graphs, diagram, photographs, table. 9 ref. (Q3, Al)

784-Q. Plastic Design of Plate Girders With Unstiffened Webs. Jacques Heyman and V. L. Dutton. *Welding and Metal Fabrication*, v. 22, July 1954, p. 265-272.

Theoretical and experimental consideration of actual collapse conditions. Diagrams, tables, photographs, graphs. 4 ref. (Q23, CN)

785-Q. Effect of Thermal Activation on Fatigue Life of Butt Welds. A. M. Freudenthal and R. A. Heller. *Welding Journal*, v. 33, July 1954, p. 327S-338S.

Effect of rest periods at moderately elevated temperatures on mild steel specimens. Tables, graphs, diagram. 17 ref. (Q7, CN)

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Tests on various types of weld joints. Diagrams. (Q7, K9, CN)

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Importance of accurate temperature measurements. Photographs. (Q3, S16)

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Phase diagrams of iron-nitrogen system; influence of nitrogen on transformations, aging, and mechanical properties of plain carbon and alloy steel; production of steel with low nitrogen content; effect of nitrogen on welding; properties and characteristics of nitriding steel; and effect of production method on solubility of nitrogen in steel. Tables, graphs, micrographs, diagrams. 143 ref. (Q general, M24, N7, ST)

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X-ray examination of deformation mechanism during abrasion of surfaces. Micrographs, table. 13 ref. (Q24, Fe, ST)

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Effect of small cavities on mechanical properties. Tables, graphs. 2 ref. (Q21)

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Macro and microhardness studies of unalloyed steels with 0.3 to 1.7% carbon. Graphs, micrographs. 11 ref. (Q29, CN)

792-Q. (German.) **Determination of Internal Stresses From X-Ray Lattice Constant Measurements.** Viktor Hauk. *Archiv für das Eisenhüttenwesen*, v. 25, nos. 5-6, May-June 1954, p. 273-278.

Results of plastic and residual deformations show that composition, grain size, structure, and type and amount of cementite determine presence of internal stresses. Tables, micrograph, graphs. 45 ref. (Q25, CN)

793-Q. (German.) **Testing the Vibration Resistance of Cable Sheathing of Unalloyed and Slightly Alloyed Lead.** Wilhelm Hofmann and Reinhard Müller. *Zeitschrift für Erzbergbau und Metallhüttenwesen*, v. 7, no. 6, June 1954, p. 247-252.

Preparation and testing of lead tubes. Results indicate improvements may be accomplished by small additions of copper, tin and antimony. Diagrams, graphs, table. (Q9, Pb)

794-Q. (Russian.) **Fine Structure of Aging Alloys in the Clearly Plastic Region.** N. F. Siutkin. *Doklady Akademii Nauk SSSR*, v. 96, no. 3, May 21, 1954, p. 503-505.

Changes of mechanical properties of zinc-aluminum alloys under various deformation rates and broad temperature range. Graphs. 4 ref. (Q24, Zn, Al)

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Investigations on beryllium and aluminum bronze and technically pure iron. Graphs. 4 ref. (Q24, Al, Fe)

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Application and mechanical properties of high-strength cast iron and forged steel shafts. Diagrams, tables, graphs, photographs. 5 ref. (Q7, CI, ST)

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Various bushing and cam compositions tested. Tables, graphs, diagram, photograph. (Q9, CI)

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Longitudinal and transverse strengths of butt welds. Tables, photographs. (Q23, CN)

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Initiation and propagation of fatigue cracks; effects of notches and pre-existing defects; and relations between other mechanical properties and fatigue strength. Diagrams, tables, photographs. (Q7)

801-Q. The Impact Properties of Flake Graphite Cast Irons. G. N. J. Gilbert. *British Cast Iron Research Association. Journal of Research and Development*, v. 5, June 1954, p. 298-317 + 1 plate.

Impact values for notched and unnotched specimens of eight cast irons correlated with the resilience obtained in a corresponding slow bend test. Tables, diagrams, photographs, graphs. 5 ref. (Q6, CN, CI)

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Disadvantages of stress concept and possibilities of strain concept. Diagrams, graphs, micrograph. 8 ref. (Q26)

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Statistical comparisons of mechanical properties of castings of various shapes and bars of varying sizes. Tables, diagrams. 9 ref. (Q general, E general, CI)

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Mathematical study of anticipated stress and strength areas of component parts. Photographs, tables, diagrams. 8 ref. (Q25)

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Compares experimental results for three ferrous metals and an aluminum alloy with conventional fatigue data. Graph, tables. 17 ref.
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Pattern of fluctuating stress consisted of repeated blocks of 10,000 cycles during which a minor or low stress amplitude was applied during the initial portion and a major or high stress amplitude was applied during the remainder of the cycles in each repeated block. Diagrams, tables, graphs. 15 ref.
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Fatigue, stress-rupture, and creep data obtained under various combinations of mean and alternating axial stress for rolled 24S-T4 at 300 and 500° F. Graphs. 8 ref.
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Significance and measurement of the Poisson effect in the V-notch and keyhole Charpy tests. Graphs. 3 ref. (Q6, CN)

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Charpy V-notch specimens of AISI 4340 steel heat treated to 210,000 psi. and 230,000 psi. were tested from 320 to −320° F. by the conventional impact test and by slow bending. Graphs, photographs.
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Stresses applied consist of two equal compressive principal stresses with the third principal stress either tension or compression. These triaxial stresses are produced by subjecting a cylindrical specimen to radial hydraulic pressure and axial tension or compression. Diagrams, graphs, photographs. 6 ref.
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Design and features of machine for application and maintenance of constant loads. Diagram, graphs, table. (Q27)

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In-place properties of deep soil deposits in relation to pile foundations. Tables, graphs, diagram, photographs. 7 ref. (Q2)

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Tests were made on sheet specimens of 24S-T3 and 24S-T81 aluminum alloys at 300° F., SAE 4130 steel at 800° F., and AISI 310 stainless steel at 1500° F. Tables, graphs. (Q3, Al, SS, AY)

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Effect of state of anneal on creep. Tables, graphs, diagram, photographs. 11 ref. (Q3, Zr)

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Alloys tested were 90-10 copper-nickel containing 0.68% iron, 90-10 copper-nickel containing 1.08% iron, and 80-20 copper-nickel containing 0.19% iron. Micrographs, tables, graphs. 6 ref. (Q3, Cu, Ni)

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Mechanical properties of aluminum alloys. Design factors including stresses and fatigue characteristics. Graphs, tables. 5 ref.
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Method of estimating internal pressure required to cause plastic expansion of a uniform circular tube. Tables, graphs, diagram, photograph. 8 ref. (Q23, ST)

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Elastic limits of various types of Z5Z and RZ5 alloys. Tables, graphs, diagrams, micrographs. (Q21, Mg, Zr)

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Effects of structure and metallic and nonmetallic inclusions on properties. Graphs, tables, diagrams. (To be continued.) (Q general, CI)

815-Q. (Russian.) **Relaxation Phenomena in Metals and Alloys Subjected to Deformation.** V. S. Postnikov. *Uspekhi Fizicheskikh Nauk,* v. 53, no. 1, May 1954, p. 87-108.

Formulas for Hooke's law. Boltzmann theory of elastic aftereffect. Relaxation spectrum. Thermodynamic principles. Graphs. 32 ref. (Q21)

816-Q. Field Testing Technique Using the Bonded-Wire Strain Gage. Francis G. Tatnall. *ASTM Bulletin,* 1954, no 199, p. 62-66.

Use of gage on structural members. Diagrams. (Q25)

817-Q. Analysis of Stresses Induced by a Sandwich Proof Tester. W. S. Ericksen. *ASTM Bulletin,* 1954, no. 199, p. 80-83.

Discussion of stresses theoretically induced in a flat sandwich panel by a vacuum-operated device that applies a concentrated load and formulas for estimating stresses in core and facings. Photographs, diagrams. (Q25)

818-Q. Fatigue Strength of Screw Threads. J. E. Field. *Engineer,* v. 198, July 23, 1954, p. 123-124.

Effect of specimen size and hardness of nut material. Tables. (Q7)

819-Q. Friction and Wear Phenomena. O. E. Teichmann and W. P. Green. *National Conference on Industrial Hydraulics, Proceeding of the 9th Meeting,* v. 7, 1953, p. 1-26; disc., p. 27.

Effects of temperature, oxide films and metal properties. Hydrodynamic lubrication. Tables, diagrams, graphs, photographs. 13 ref. (Q9)

820-Q. Experimental Stress Analysis of Stiffened Cylinders With Cutouts. Shear Load. Floyd R. Schlechte and Richard Rosecrans. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3192, July 1954, 87 p.

Tests of a cylindrical semimonocoque shell of circular cross section mounted as a cantilever and loaded by direct shear at the tip. Photographs, diagrams, tables. 5 ref. (Q25)

821-Q. The Mechanical Properties of Consumable-Arc-Melted Kroll-Process Zirconium. R. G. Nelson, H. Kato and R. L. Carpenter. *U. S. Bureau of Mines, Report of Investigations* 5063, June 1954, 13 p.

Effects of temperature, cold work and annealing. Tensile properties are compared with earlier graphite-melted and crystal-bar zirconium. Graphs, tables. 14 ref. (Q23, Zr)

822-Q. (French.) **Variation of Effect of Adsorbed Gases on Mechanical Strength of Metal Wires as a Function of Their Diameter.** Auguste Clauss, *Comptes rendus,* v. 239, no. 1, July 5, 1954, p. 25-27.

Dependence of tensile strength on nature of gas. Graphs. 1 ref. (Q23, W, Ag, Cu, Pt)

823-Q. (German.) **Examining the Quality of Photo-Elastic Materials.** R. Hiltscher. *Forschung auf dem Gebiete des Ingenieurwesens,* v. 20, Ausgabe B, no. 3, 1954, p. 66-76.

Comparison of available materials by a simplified test. Table, graphs, photographs, diagram. 13 ref. (Q25)

824-Q. (German.) **Strain of a Bending Beam Caused by the Transverse Impact of a Mass.** Hans-Heinrich Emschermann and Karl Rühl. *Forschung auf dem Gebiete des Ingenieurwesens,* v. 20, Ausgabe B, *VDI-Forschungsheft,* no. 443, 1954, 32 p.

Strain gage and photo-elastic studies. Results compared with American data. Photographs, graphs, diagrams, tables. 47 ref. (Q25)

825-Q. (German.) **Recovery of Internal Friction in Brass Immediately After Deformation.** Werner Köster and Erdmann Stolte. *Zeitschrift für Metallkunde,* v. 45, no. 6, June 1954, p. 356-365.

Apparatus and technique. Effects of degree of deformation, temperature and grain size on recovery rate. Diagram, graphs, table. 16 ref. (Q22, Cu)

826-Q. (Russian.) **Problem of Elastic-Plastic Bending of a Beam.** V. V. Moskvitin. *Moscow Universiteta, Vestnik, Seriia Fiziko-Matematicheskikh i Estestvennykh Nauk,* v. 9, no. 5, May 1954, p. 33-40.

Mathematical analysis of deformation and stresses. Graphs, table, diagrams. 2 ref. (Q5)

827-Q. (Russian.) **Problem of Large Elastic-Plastic Deformations.** V. A. Lomakin. *Moscow Universiteta, Vestnik, Seriia Fiziko-Matematicheskikh i Estestvennykh Nauk,* v. 9, no. 5, May 1954, p. 41-45.

Mathematical analysis. 5 ref. (Q24)

828-Q. (Russian.) **Graphic-Analytical Method of Analyzing Transverse Plastic Bending.** G. G. Balovnev. *Vestnik Mashinostroeniia,* v. 34, no. 7, July 1954, p. 12-15.

Determination of carrying capacity and residual deformation of beams. Graphs. 6 ref. (Q5)

829-Q. (Russian.) **Coefficient of Friction in a Heavily Loaded Contact.** N. F. Kuz'min. *Vestnik Mashinostroeniia,* v. 34, no. 5, May 1954, p. 18-26.

Special apparatus determines dependence of friction on sliding, rolling, lubricant, etc. Diagrams, graphs. 13 ref. (Q9)

830-Q. (Russian.) **Effect of Preliminary Treatment on Strength of Austenitic Steel.** I. A. Oding and A. P. Shishkova. *Vestnik Mashinostroeniia,* v. 34, no. 7, July 1954, p. 40-45.

Hot working, cold hardening, aging. Changes in hardness, plasticity and microstructure. Graphs, tables. 4 ref. (Q23, AY)

831-Q. (Russian.) **Results of Service Tests on Anti-Friction Cast-Iron Bushings in Machine-Tool Equipment.** Ia. G. Lifshits and S. F. Frolov. *Vestnik Mashinostroeniia,* v. 34, no. 7, July 1954, p. 48-50.

Condition of bushings in various lathe and press parts after service up to 8000 hr. Table. (Q9, CI)

832-Q. (Russian.) **Nature of Deformation of High-Strength Cast Irons.** K. V. Kovalev and A. A. Novik. *Vestnik Mashinostroeniia,* v. 34, no. 5, May 1954, p. 69-72.

Compares tension and torsion strengths of nodular iron with chromium-molybdenum and unalloyed irons. Tables, graphs. 3 ref. (Q27, Q1, CI)

833-Q. (Spanish.) **Fatigue Resistance of Welded Structures.** Garcia Z. Martin. *Ciencia y técnica de la Soldadura,* v. 4, no. 17, Mar.-Apr. 1954, 20 p.

Effect of notches, weld defects and material properties on fatigue resistance of welds. Graphs, micrographs, photographs, tables, diagrams. 7 ref. (Q7, K general, ST)

834-Q. (Photocopy.) **Low-Temperature Mechanical Properties, Including Fatigue, of Titanium-Base Alloys RC-130-B and Ti-150-A.** Report no. PB 112768. 41 p. 1952. Library of Congress, Publication Board Project, Washington 25, D.C. Microfilm $2.50; photostat $6.25.

Tensile strength, fatigue, hardness, impact and thermal expansion at temperatures ranging from 25 to −250° C. (Q general, P11, Ti)

835-Q. (Book.) **Elements of Structural Engineering.** Ernest C. Harris. 505 p. 1954. Ronald Press Co., 15 E. 26th St., New York, N. Y. $7.00

Noncivil engineering text including structural theory as applied to cranes and conveyor supports, welding, and new electrical and mechanical equipment affecting safety of existing buildings. (Q general)

836-Q. (Book.) **Residual Stresses in Metal and Metal Construction.** W. R. Osgood, editor. 363 p. 1954. Reinhold Publishing Corp., 330 W. 42nd St., New York 36, N. Y. $10.00.

Collection of 22 papers by residual stress experts. Comprehensive coverage of all types of residual stress existing in machines and structures whether arising from welding, machining, or other causes. (Q25)

837-Q. (Book.) **Review of Previous Work on Short-Time Tests for Predicting Fatigue Properties of Materials.** Report no. PB 111374. 65 p. 1953. U.S. Department of Commerce, Room 6227, Commerce Building, Washington 25, D.C. $2.50.

Methods of rapidly determining fatigue properties of materials without completing the usual S-N fatigue diagram. (Q7, Ti)

838-Q. (Book.) **Society for Experimental Stress Analysis, Proceedings** (Annual Volume), v. 11, no. 2, 1954,

222 p. Society For Experimental Stress Analysis, Central Square Station, P.O. Box 168, Cambridge 39, Mass.

Strain gage techniques; creep and fatigue testing; brittle coating and photo-elastic stress analysis. Individual papers separately abstracted. (Q25)

839-Q. (Book.) **Strength of Materials.** G. H. Ryder. 278 p. 1953. Cleaver-Hume Press Ltd., Wrights Lane, Kensington, London, W. 8, England. 21s.

Based on syllabus of the University of London with additional material on riveted joints, reinforced concrete, and continuous beams. Includes graphical methods useful in design, and essentials of materials testing. (Q23)

R

Corrosion

328-R. Insulating Joints in Long Pipelines. I. Needs Hazards, Protection. M. C. Miller. II. Insulating Joints. Ralph E. Kuster. *Gas,* v. 30, July 1954, p. 98, 100, 102.

Protection against electric current and corrosion hazards. Photographs, diagrams. (R10)

329-R. Fundamentals of Underground Corrosion. Frank E. Costanzo. *Gas Age,* v. 114, July 15, 1954, p. 49-54, 78, 80.

Interpretation of measurement of electric potentials, currents and resistance. Cathodic protection. Tables, diagrams. (R8, R10)

330-R. The Oxidation of Copper in the Temperature Range 400° to 1500° F. *Industrial Heating,* v. 21, July 1954, p. 1312, 1458.

Effect of different oxidizing atmospheres. Recrystallization effect on oxide growth. (R2, Cu)

331-R. Cooling Water Gets the Treatment. L. W. Fitzpatrick. *Industry and Power,* v. 67, July 1954, p. 78-82.

Corrosion fundamentals. Treatment to control scale and slime. Chlorine treatment. Photographs, tables. (R4)

332-R. Corrosion Aspects of the Vanadium Problem in Gas Turbines. S. H. Frederick and T. F. Eden. *Institution of Mechanical Engineers, Proceedings,* v. 168, no. 3, 1954, p. 125-130 + 4 plates; disc., p. 131-134.

Effect of vanadium oxide and sodium sulfate on turbine fouling and corrosion. Nickel-base heat resisting alloys of the Nimonic type offer higher resistance to attack than the austenitic steels; some degree of protection is afforded by electrodeposited coatings of chromium. Tables, graphs, micrographs, photographs. 8 ref. (R9, Ni, SS, SG-h)

333-R. Stress-Corrosion Resisted by Additions of Ti and Ta-Cb. (Digest of "Stress-Corrosion Cracking of Non-alloyed and Low Alloyed Steels and Its Avoidance by Additions of Titanium or Tantalum-Columbium", by E. Baerlecken and W. Hirsch; *Stahl und Eisen,* v. 73, June 1953, p. 785-789.) *Metal Progress,* v. 66, no. 1-A, July 15, 1954, p. A140, A144, A146.

Previously abstracted from original. See item 438-R, 1953. (R1, ST, AY)

334-R. (Dutch.) **Corrosion Investigation on Austenitic Stainless Steel. A.** Ph. Krijff and A. De Visser. *Smit Mededelingen,* v. 9, no. 2, Apr.-June 1954, p. 38-49.

Results of laboratory tests on different types of stainless steel. Photographs, micrographs, table, graphs. 8 ref. (R11, SS)

335-R. (French.) **Problem of Scaling and Fissuring Corrosion of Refractory Alloys in Gas Turbines.** Ph. Galmiche. *Recherche Aéronautique,* 1954, no. 39, May-June, p. 45-53.

Effects of composition of corrosive atmosphere. Table, diagram, photograph, micrographs. 15 ref. (R2, R3, SG-h)

336-R. (German.) **Protection Against Rusting of Interior of Low-Pressure Air Ducts.** Franz Eisenstecken. *Glückauf,* v. 9, nos. 25-26, June 19, 1954, p. 651-661.

Corrosion prevention in ducts carrying carbon dioxide, sulfur dioxide, and sulfur trioxide. Graphs, photographs, diagrams, table. 2 ref. (R10, R9)

337-R. (German.) **The Microscopic Forms of Iron Rust. IV.** Adolf Ackermann. *Kolloid-Zeitschrift,* v. 137, no. 1, June 1954, p. 20-24.

Experimental investigations revealed characteristic forms ascribed to effect of magnetic fields. Diagrams, micrographs. 1 ref. (R2, M27, Fe)

338-R. (Italian.) **Corrosion Cells by Thermal Differentiation.** G. Bombara. *Rivista dei Combustibili,* v. 8, no. 5, May 1954, p. 329-338.

Electrolytic corrosion caused by differential heating of a metallic system in contact with an aqueous solution. Diagrams, graphs. 1 ref. (R1)

339-R. (Russian.) **Charged State of Photographically Active Particles Precipitated by Metals During Atmospheric Corrosion.** I. L. Roikh and A. I. Shcherbak. *Zhurnal Fizicheskoi Khimii,* v. 28, no. 5, May 1954, p. 769-771.

Effect of particles on photographic plate similar to effect of light. Diagram. 10 ref. (R3, P17)

340-R. (Russian.) **Electrochemical Behavior of Iron in Hot Concentrated Solutions of Alkali. I-II.** V. V. Losev and B. N. Kabanov. *Zhurnal Fizicheskoi Khimii,* v. 28, no. 5, May 1954, p. 824-836, 914-925.

Capacitance of electrode during three processes. Effect of concentration of iron ions in solution on the anode process. Reversible nature of passivation of iron electrode. Tables, graphs. 25 ref. (R6, R10, Fe)

341-R. Sound Applications for Zinc Anodes. A. W. Peabody. *American Zinc Institute, Journal,* v. 32, 1954, p. 73-80.

Use of zinc anodes in cathodic protection of ships, water storage tanks, pipelines and electric generating stations. (R10, T general, Zn)

342-R. Galvanic Action Corrodes Through Bolts. Fred M. Reiter. *Electrical World,* v. 142, July 26, 1954, p. 118, 127.

Corrosion of bolts in poles supporting electric power lines. Corrective measures. (R1, CN)

343-R. The Performance of Aluminium Roofing Under Industrial Conditions. *Mechanical World and Engineering Record,* v. 134, July 1954, p. 300-303.

Case histories reveal high standard of durability in a variety of atmospheres. Graphs, table. (R3, Al)

344-R. (French.) **Speeds of Solution of Iron and Aluminum in Aqueous Hydrochloric Acid Solutions.** T. G. Owe Berg. *Journal de chimie physique,* v. 51, no. 4, Apr. 1954, p. 141-160.

Relation of dissolving times to acid concentrations and temperature. Graphs, tables. 9 ref. (R5, Fe, Al)

345-R. (French.) **Abnormal Corrosion Products on Protected Metals.** E. Geffroy. *Métaux, Corrosion-Industries,* v. 29, no. 345, May 1954, p. 212-215.

Comparison of various platings. Problem of crystalline build-ups causing short circuits and unsteady voltage. Table. (R3)

346-R. (French.) **Inhibition and Activation.** J. Frasch. *Métaux, Corrosion-Industries,* v. 29, no. 345, May 1954, p. 216-224.

Theory of corrosion and its prevention by anodic and cathodic polarization. Tables, diagrams, graphs, micrograph. (R10)

347-R. (German.) **Cathodic Protection With Magnesium Anodes Against Soil Corrosion.** Werner Rausch. *Gas und Wasserfach,* v. 95, Ausgabe Gas, no. 13, July 1, 1954, p. 416-421.

Requirements, installation of equipment and efficiency. Graphs, photograph, diagram. 15 ref. (R10, R8, ST)

348-R. Some Observations of Cathodic Protection Potential Criteria in Localized Pitting. T-2-C Report. Pub. 54-2. *Corrosion,* v. 10, Aug. 1954, p. 232-236.

Minimum current requirements for cathodic protection Diagrams, tables, graph. 9 ref. (R10)

349-R. Survey of Corrosion Control in California Pumping Wells. Frank E. Davie and Preston W. Hill. *Corrosion,* v. 10, Aug. 1954, p. 248-251; disc., p. 251.

Use of inhibitors resulted in an average of 50% reduction in pulling jobs. Material replacements greatly reduced. Graphs, tables. (R10)

350-R. A Method of Considering Costs While Selecting Materials for Corrosion Service. E. F. T. Rice. *Corrosion,* v. 10, Aug. 1954, p. 252.

Suggested corrosion rating guide includes cost factor by providing separate corrosion limits for metals of various price range. Table. (R general)

351-R. A Promising Spray-Applied Inhibitor of Internal Corrosion of Oil Tank Ships. J. D. Sudbury, D. A. Shock and F. W. Mann. *Corrosion,* v. 10, Aug. 1954, p. 253-258.

Good results shown with an inhibitor incorporating calcium and sodium sulfonates, but hydrocarbons with lower flash points are sought. Photographs, diagrams, tables, graphs. 4 ref. (R10)

352-R. Beginnings of Corrosion Prevention. Robert H. Pope. *Corrosion,* v. 10, Aug. 1954, p. 259.

Early public utility problems in underground corrosion and methods of prevention. (R8)

353-R. Selecting Gaskets to Limit Corrosion of Stainless Steel Bolted Joints in a Chemical Plant. E. V. Kunkel. *Corrosion,* v. 10, Aug 1954, p. 260-266.

Corrosion control by proper selection of gasket material, proper joint design and modification of corrosion characteristics of the process fluid being handled. Photographs, diagrams, tables. (R5, R6, SS)

354-R. Organizing and Operating a Successful Program of Corrosion Mitigation. M. G. Markle. *Corrosion (News Section),* v. 10, Aug. 1954, p. 22, 24-25.

Enlightening management on benefits of a corrosion prevention program and how it can be accomplished economically. (R general)

355-R. Formation of Anodic Oxide Films on Cathodes. D. A. Vermilyea. *Electrochemical Society, Journal,* v. 101, Aug. 1954, p. 389-392.

Tantalum oxide may be formed on tantalum when the tantalum potential on the hydrogen scale is negative. Experimental results and discussion. Diagrams, graphs. 2 ref. (R2, R11, Ta)

356-R. Corrosion of Aluminum in Potassium Chloride Solutions. I. Effects of Concentrations of KCl and Dissolved Oxygen. W. Beck, F. G. Keihn and R. G. Gold. *Electrochemical Society, Journal,* v. 101, Aug. 1954, p. 393-399.

Weight loss increased with time and increasing oxygen concentration but decreased with increasing electrolyte concentration. Tables, graphs, diagram. 21 ref. (R5, Al)

357-R. Studies on the Anodic Polarization of Zirconium and Zirconium Alloys. Mario Maraghini, George B. Adams, Jr., and Pierre Van Rysselberghe. *Electrochemical Society, Journal,* v. 101, Aug. 1954, p. 400-409.

Corrosion potentials in various electrolytes. Factors affecting oxide film formation. Tables, graphs. 7 ref. (R11, Zr)

358-R. Cut Deethanizer Corrosion 92%. *Petroleum Processing,* v. 9, Aug. 1954, p. 1192-1193

Injection of organic inhibitor protects metal in reflux lines for Sun Oil Co. Diagram, photograph. (R10)

359-R. (German.) **The Mechanism of Oxidation of Iron and Alloy Steels at Higher Temperatures.** K. Hauffe. *Metalloberfläche,* Ausgabe A, v. 8, no. 7, July 1954, p. 97-103.

Lattice structures, diffusion of oxygen and alloying elements in connection with oxidation and design of oxidation resistant steels. Graphs, micrograph, table, diagram. 35 ref. (R2, Fe, AY)

360-R. (German.) **Discontinuous Films on Copper.** E. Menzel and W. Stössel. *Naturwissenchaften,* v. 41, no. 13, July 1954, p. 302-303.

Oxidation of high-purity copper at low-oxygen pressures. Micrographs. 5 ref. (R2, Cu)

361-R. (German.) **Protection of Metals by Means of Corrosion Inhibitors.** A. Bukowiecki. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 20, no. 6, June 1954, p. 169-186.

Critical review on inhibitors and mechanism of inhibition. Graphs, tables. 121 ref. (R10)

362-R. (German.) **Double-Layer Build-Up on Iron and Lead Electrodes in Soils.** Tihomil Markovic and P. Kirkov. *Werkstoffe und Korrosion,* v. 5, no. 7, July 1954, p. 241-243.

Data agree with previous corrosion tests. Table, graphs. 4 ref. (R8, Fe, Pb)

363-R. (German.) **The Influence of Soil Dampness on Corrosion Rates of Iron and Lead in the Earth.** Tihomil Markovic. *Werkstoffe und Korrosion,* v. 5, no. 7, July 1954, p. 244-246.

Corrosion mechanisms in various soils. Graphs. 4 ref. (R8, Fe, Pb)

364-R. (German.) **Corrosion Protection in the Processing of Copper Solutions.** Wilhelm Teworte. *Zeitschrift für Metallkunde,* v. 45, no. 6, June 1954, p. 387-391.

Materials and techniques for equipment used in hydrometallurgy of copper. Diagrams, photographs. (R10, B14, Cu)

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285-S. Automatic Ultrasonic Inspection. *Automotive Industries,* v. 111, July 15, 1954, p. 49, 104.

Description of equipment installed at Allison Division, General Motors Corp. Photograph. (S13)

286-S. The Use and Scope of Iridium-192 for the Radiography of Steel. R. Halmshaw. *British Journal of Applied Physics,* v. 5, July 1954, p. 238-243.

Definition obtainable and its importance with different types of flaw. Ranges of thickness of welds and castings on which satisfactory flaw-sensitivity should be obtained. Graphs, tables. 10 ref. (S13, ST)

287-S. Some Consideration of the Errors of Brightness and Two-Colour Types of Spectral Radiation Pyrometer. E. C. Pyatt. *British Journal of Applied Physics,* v. 5, July 1954, p. 264-268.

Instrument limitations. Derives chart from which errors can be calculated for any pyrometer for all possible values of emissivity. Diagrams, graphs. (S16)

288-S. Some Applications of Ultrasonic Testing. *Machinery (London),* v. 85, July 2, 1954, p. 3-10.

Applications of the reflectoscope. Photographs. (S13)

289-S. Selection of Methods for Nondestructive Inspection. ASM Committee on Nondestructive Inspection. *Metal Progress,* v. 66, no. 1-A, July 15, 1954, p. 159-163.

Definition of methods, evaluating soundness of steel welds, detecting cold shuts in cast bronze bushings, inspection of heat resisting metals, determining soundness of aircraft turbine disks, and sorting mixed lots of steel. Tables. 26 ref. (S13, S10)

290-S. (French.) **Standardization in the Field of Metallurgy.** Pierre Salmon. *Revue de métallurgie,* v. 51, no. 6, June 1954, p. 380-384.

Standardization as means of resolving problems between manufacturers and users of iron and steel products. (S22, Fe, ST)

291-S. (German.) **Experiments on the Efficiency of a 31-Mev. Betatron for Irradiation of Steel.** Hermann Möller, Walter Grimm and Helmut Weeber. *Archiv für das Eisenhüttenwesen,* v. 25, nos. 5-6, May-June 1954, p. 279-291.

Application in nondestructive testing reveals important advantages over X-ray method. Photographs, graphs, diagrams. (S13, ST)

292-S. (German.) **Electrical Control of Furnace Atmosphere and Exhaust Gases With Modern Gas-Analysis Equipment.** A. Naumann. *Berichte der deutschen keramischen Gesellschaft,* v. 31, no. 6, June 1954, p. 194-199.

Development of two industrial flue-gas analysis instruments. Graphs, diagrams, photographs. (S11)

293-S. (Spanish.) **Nondestructive Testing of Welded Structures by Means of Ultrasonic Waves.** F. Ramirez Gomez. *Ciencia y técnica de la Soldadura,* v. 4, no. 16, Jan.-Feb. 1954, 22 p.

Characteristics of ultrasonic apparatus. Examples of tests on butt-joint welds. Photographs, diagrams, table, graph. (S13, K9)

294-S. Materials Testing by Betatron Radiography. R. Wideröe. *Engineers' Digest,* v. 15, July 1954, p. 277-279. (Translated from *Zeitschrift des Vereines Deutscher Ingenieure,* v. 96, nos. 15-16, June 1, 1954, p. 451-456.)

Previously abstracted from original. See item 277-S, 1954. (S general)

295-S. Proposed Tentative Specifications for Nickel-Tin Bronze Castings. *Foundry,* v. 82, Aug. 1954, p. 149-150.

Comprehensive data sheet. Tables. (S22, Cu)

296-S. Design Considerations Applying to Specification of Surface Finish for Machined Parts. James F. Hagen and Earl E. Lindberg. *General Motors Engineering Journal,* v. 1, July-Aug. 1954, p. 12-17.

Analysis of surface geometry. System specifies degree of surface finish in terms of the average roughness, waviness and lay of the surface. Diagrams, micrographs. 4 ref. (S15)

297-S. A Discussion of Instrumentation for Determining Surface Roughness of Machined Parts. James F. Hagen and Earl E. Lindberg. *General Motors Engineering Journal,* v. 1, July-Aug. 1954, p. 18-23.

Thorough study indicates the most suitable instruments for production-line use are of the tracer type. Photographs, diagrams, graph. (S15)

298-S. X-Ray While Hot to Speed Pipe Welding Inspection. J. K. Bell. *Industry & Welding,* v. 27, Aug. 1954, p. 58 + 4 pages.

Nondestructive examination by hot radiography permits quality checks on-the-spot at any stage and at temperatures up to 1200° F. Photograph, diagram, table. (S13, K9)

299-S. Prevention of Sucker-Rod Failures by Electronic Inspection. F. Lawrence Resen. *Oil and Gas Journal,* v. 53, Aug. 2, 1954, p. 82-84.

Electronic inspection reduces shutdown periods. Photographs, graphs, table. (S13)

300-S. (German.) **Non-Contact Measurement of Strip Thickness During the Finishing Process.** H. Fassbender. *Aluminium,* v. 30, no. 7, July 1954, p. 290-297.

Equipment and method for use of beta-rays. Graphs, tables, diagrams, photographs. 5 ref. (S14, Tl, Sr, Y)

301-S. (German.) **New Process of Measuring Bearing Length of Drawing-Die Holes.** Werner Lueg. *Stahl und Eisen,* v. 74, no. 14, July 1, 1954, p. 874-876.

Design and operation of two new instruments for inspection of wire dies. Diagram, photographs. (S14, F28)

302-S. Pig Iron and Blast Furnace Ferroalloys, Chemical Compositions. *American Iron and Steel Institute, Contributions to the Metallurgy of Steel,* no. 44, 1954, 20 p.

Standard grades, sampling and chemical analysis. Tables. (S22, B11, B22, CI, Fe)

303-S. Reference Book Sheets. Limits and Fits for Cylindrical Parts. IV-VI. *American Machinist,* v. 98, Aug. 2, 1954, p. 143, 145, 147.

Proposal for an American standard of clearance locational and transition locational fits. Tables, graphs. (To be continued.) (S22, S14)

304-S. Aluminum Specs Are Standardized. *Steel,* v. 135, Aug. 9, 1954, p. 94-95.

New system of uniform alloy designations will clear up confusion from special numbers. Basis is four-

digit number, last two digits of which are same as old number. Tables. (S22, Al)

305-S. Year's Use Proves Value of Betatron. A. N. Haig and H. B. Norris. *Steel,* v. 135, Aug. 9, 1954, p. 102-103.

Savings at Allis-Chalmers Mfg. Co. paid off the $350,000 cost before the 22-million volt machine had its first birthday. Photograph, graph. (S13)

306-S. (German.) **Principles of Control Technique.** H. Bönnhoff. *Fette, Seifen, Anstreichmittel,* v. 56, no. 6, June 1954, p. 399-404.

Automatic temperature, pressure, quantity and flow controls. Diagrams. 17 ref. (S16, S18)

307-S. (German.) **Continuous Contactless Measuring of Weight Per Unit Area or Thickness With the Aid of Radioactive Substances.** Fritz Alberts. *Kautschuk und Gummi,* v. 7, no. 7, July 1954, p. 157WT-162WT.

Design and operation of device, advantages of method. Diagrams, graphs, photographs, tables. 6 ref. (S14)

308-S. (German.) **Testing Thin Metal Films With an Electrical Measuring Process.** Albert Keil and Gertrud Offner. *Sprechsaal,* v. 87, no. 14, July 20, 1954, p. 345-347.

Measuring thickness and conductivity of nonmagnetic coatings on ceramics. Photograph, graph. 5 ref. (S14, P15)

309-S. (Spanish.) **Nondestructive Testing of Welds by Means of Ultrasonic Waves.** F. Ramorez Gomez. *Ciencia y técnica de la Soldadura,* v. 4, no. 17, Mar.-Apr. 1954, 10 p.

Relation to X-ray inspection. Apparatus and its applications. Defect identification criteria. Graphs, micrographs, diagrams. 14 ref. (S13, K9, ST)

310-S. (Book.) **British Engine, Boiler & Electrical Insurance Co. Ltd., Technical Report.** New ser. v. I. 215 p. Nov. 1952. British Engine, Boiler & Electrical Insurance Co. Ltd., 80 Lombard St., London E.C.3, England.

Corrosion and failures in tubes, joints and other parts of boilers, pressure vessels, engines, turbines, electrical machinery and cranes. Test procedures to determine causes of failures. Photographs, tables, diagrams, micrographs. 20 ref. (S21, R11)

T

Applications of Metals in Equipment

239-T. Tanker Heating Coils of Aluminium Alloy. Lightweight Corrosion-Free Installation. *Engineering,* v. 178, July 2, 1954, p. 28.

Details of installation of aluminum alloy coils in oil tanker. Diagram, photograph. (T27, Al)

240-T. The Manufacture and Properties of Automobile Suspension Springs. C. J. Dadswell, J. E. Russell and R. Fielding. *Machinery (London),* v. 84, June 18, 1954, p. 1297-1301; v. 85, July 2, 1954, p. 29-32.

Condensed from paper before Institute of Mechanical Engineers. Coil springs; torsion bars; laminated springs. Finishing and scragging treatment; testing and inspection. Photographs, tables. (T7, SG-b)

241-T. The White-Metalling Process. A. J. Gibbs Smith. *Machinery Lloyd (Overseas Ed.),* v. 26, July 3, 1954, p. 87, 89.

Methods employed for producing bearings for railway rolling stock. Photograph, diagrams. (T7, SG-c, Sn, Zn, Cu, Pb, Sb)

242-T. A Vapor Barrier of Laminated Mylar and Aluminum. James G. Macormack. *Refrigerating Engineering,* v. 62, July 1954, p. 58-60, 98, 100.

Polyester film provides flexible strength, aluminum foil provides moisture impermeability. Diagram, photographs, graphs. (T27, Al)

243-T. (French.) **Advantages of Taper Roller Bearings Applied to Roll Journals.** W. P. Snedden. *Revue universelle des mines,* v. 10, ser. 9, no. 6, June 1954, p. 242-249.

Assembling procedure and advantages of efficiency and economy. Diagrams, photographs. (T7, F23)

244-T. (French.) **Improvements in Aluminum-Tin Alloys for Plain Bearings.** J. W. Cuthbertson. *Revue universelle des mines,* v. 10, ser. 9, no. 6, June 1954, p. 250-257.

Fatigue resistance and wearing quality. Table, graphs, micrographs, photograph, diagram. (T7, Q7, Q9, Al, Sn)

245-T. (Italian.) **Aluminum Packaging for Fish Products.** G. Ciani. *Alluminio,* v. 23, no. 3, May 1954, p. 269-280.

Advantages and possibilities of standardization. Photographs. (T10, Al)

246-T. (Italian.) **Aluminum Jewelry.** *Alluminio,* v. 23, no. 3, May 1954, p. 287-292.

Characteristics of pure and alloyed aluminum. Reflecting power of electrochemically polished products. Photographs, tables. (T9, L13, Al)

247-T. Aluminum on Power Cables Forecast. Kenneth S. Wyatt. *Electrical World,* v. 142, July 26, 1954, p. 94-97.

Properties and processing characteristics of aluminum sheaths for electric power and communication cable. Graph, photographs, tables. (T1, Al)

248-T. Copper and Aluminum Making Inroads on Use of Lead in U.K. Building, Cable Sheathing Fields. S. Cahn. *Metals (Daily Metal Reporter Monthly Supplement),* v. 25, July 1954, p. 9-10.

Characteristics of aluminum and lead. Increase of usage in applications formerly monopolized by lead. (T26, T7, Al, Cu, Pb)

249-T. Installing and Avoiding Failures in Babbitt Bearings. *Metal-Working,* v. 10, Aug. 1954, p. 16-17.

Causes for bearing failure, selection of materials, melting, preparation for bonding and casting the liner. Tables. (T7, Sn, Pb)

250-T. Good Design in Aluminum Furniture. *Modern Metals,* v. 10, July 1954, p. 44, 46, 48.

Production demands and distribution. Photographs. (T10, Al)

251-T. Aluminum vs. Steel in Railroads, Automobiles, Ships. II. *Modern Metals,* v. 10, July 1954, p. 53 + 4 pages.

Comparison of properties for application to various rolling stock equipment. Tables, photograph. (T23, T21, T22, Al, ST)

252-T. Structural Uses for Aluminum Extrusions in Europe. Cedric Marsh. *Modern Metals,* v. 10, July 1954, p. 70-72, 74.

Application in heavy construction. Photographs. (T26, Al)

253-T. Aluminum Scaffolds. *Modern Metals,* v. 10, July 1954, p. 76-77.

Light, strong, safe and economical. Photographs. (T26, Al)

254-T. Progress in Metals. Application of Iron Castings and Low-Alloy Steels in Refining. W. L. Nelson. *Oil and Gas Journal,* v. 53, Aug. 2, 1954, p. 111-112.

Compositions, properties and uses. Table. (T29, CI, AY)

255-T. Metallurgical Problems in Nuclear Power Reactors. II. Design Considerations. Henry H. Hausner and John R. Bedell. *Sylvania Technologist,* v. 7, July 1954, p. 83-85.

Cladding of fuel elements, heat transfer to coolant, corrosion problems and radiation damage. Tables. 6 ref. (T25)

256-T. Marine Propellers—A Guide to the Literature on Design and Production. G. G. M. Carr-Harris. *Canadian National Research Council, Technical Information Service Report no.* 40, June 1954, 22 p.

Design and manufacture, pattern and mold making techniques, alloys and pouring procedures, gaging, machining and finishing. Diagrams, charts, table. 98 ref. (T22, E11, G17, L general, Cu)

257-T. Cutting Edge Lubricant Built-In. *Steel,* v. 135, Aug. 9, 1954, p. 116-117.

Sulfur added to toolsteels gives free machining and longer tool life. Photographs, graphs, micrographs. (T7, G21, TS)

258-T. Some Useful Applications of Zirconium. J. H. McClain and R. W. Nelson. *U. S. Bureau of Mines, Information Circular* 7686, June 1954, 7 p. + 21 plates.

Applications in laboratory and industrial equipment. Photographs. 9 ref. (T general, T8, Zr)

V

Materials
General Coverage of Specific Materials

229-V. Spheroidal-Graphite Iron. *Aircraft Production,* v. 16, July 1954, p. 266-267.

Properties and production characteristics. Photographs, tables. (CI)

230-V. Indium. Its Properties and Uses. A. F. Cadenhead. *Canadian Metals,* v. 17, June 1954, p. 16, 18.

Mechanical and physical properties. Uses as constituent of bearing metal, low melting point and glass sealing alloys. (In)

231-V. Properties and Applications of Ductile Iron. *Consulting Engineer,* v. 4, July 1954, p. 46-49, 76.

Includes specifications, materials replaced and advantages. Photographs, micrographs, tables. 23 ref. (CI)

232-V. The Selection of Constructional Steels. ASM Committee on Carbon and Alloy Steels. *Metal Progress,* v. 66, no. 1-A, July 15, 1954, p. 1 + 25 pages.

Engineering considerations, compositions, mechanical properties and hardenability of hot rolled, cold drawn, low alloy and hardenable steels. Tables, graphs. (CN, AY)

233-V. The Selection of Tool Steels. ASM Committee on Tool Steels. *Metal Progress,* v. 66, no. 1-A, July 15, 1954, p. 21-33.

Designations, compositions, applications, heat treatment and mechanical properties. Tables, graphs. (TS)

234-V. Stainless Steels. ASM Committee on Stainless Steel. *Metal Progress,* v. 66, no. 1-A, July 15, 1954, p. 34-41.

Compositions, mechanical and physical properties, production statistics, working characteristics, heat treatment, welding procedures and corrosion resistance. Tables, graphs. (SS)

235-V. Nodular Cast Iron. ASM Committee on Nodular Iron. *Metal Progress,* v. 66, no. 1-A, July 15, 1954, p. 49-52.

Processing; structure; mechanical and physical properties; oxidation resistance; machinability; applications. Tables, micrographs, graphs. (CI)

236-V. Applications of Aluminum and Aluminum Alloys. ASM Committee on Aluminum. *Metal Progress,* v. 66, no. 1-A, July 15, 1954, p. 52-63.

Applications in aircraft, automobiles, railroads, electrical appliances and chemical equipment. Mechanical, physical and corrosion properties. Fabrication procedures. Diagram, tables, graphs. (T general, P general, Q general, R general, Al)

237-V. Selection of Copper Alloys. ASM Committee on Copper. *Metal Progress,* v. 66, no. 1-A, July 15, 1954, p. 64-72.

Mechanical and physical properties, processing characteristics and corrosion resistance of wrought and cast forms. Tables. (Cu)

238-V. Magnesium and Magnesium Alloys. ASM Committee on Magnesium. *Metal Progress,* v. 66, no. 1-A July 15, 1954, p. 73-79.

Production; uses; processing; finishing; cathodic protection. Mechanical and physical properties. Graphs, tables. (Mg)

239-V. Titanium and Titanium Alloys. ASM Committee on Titanium. *Metal Progress,* v. 66, no. 1-A, July 15, 1954, p. 80-89.

Production of ingots; forming; machining; welding; heat treating; cleaning and finishing; metallography. Corrosion resistance; mechanical and physical properties. Applications. Tables, micrographs, graphs. (Ti)

240-V. New Steel Passes Toughness Test. Allen G. Gray. *Steel,* v. 135, July 19, 1954, p. 102-103.

Composition, properties and applications of Carilloy T-1. Photographs, tables. (AY)

241-V. (German.) **Alloys of Extremely Low Melting Points.** A. Keil. *Metall,* v. 8, nos. 13-14, July 1954, p. 515-518.

Properties and application of binary, ternary and quaternary alloys of bismuth, cadmium, lead, tin and indium as soft solders. Diagrams, micrographs, graph. 7 ref. (K8, T5, SG-d)

242-V. Ternalloy 7. Age-Hardenable Aluminum Alloy. *Alloy Digest,* no. Al-19, Aug. 1954.

Composition, physical and mechanical properties, heat treatment, castability, machinability, weldability, corrosion resistance and applications. (Al)

243-V. ArmaSteel. Malleablized Iron. *Alloy Digest,* no. Cl-7, Aug. 1954.

Composition, physical and mechanical properties, heat treatment, machinability, weldability and applications. (CI)

244-V. Federaloy F-1. Bearing Bronze. *Alloy Digest,* no. Cu-19, Aug. 1954.

Composition, physical and mechanical properties, castability, machinability, weldability, corrosion resistance and applications. (Cu)

245-V. Domal AZ91X. Sand Casting, Permanent Mould, and Die Casting Alloy. *Alloy Digest,* no. Mg-11, Aug. 1954.

Composition, physical and mechanical properties, castability, machinability, heat treatment, corrosion resistance and applications. (Mg)

246-V. C.D.C. Manganese Alloy No. 780. Manganese-Copper Alloy. *Alloy Digest,* no. Mn-2, Aug. 1954.

Composition, physical and mechanical properties, machinability, workability, weldability and applications. (Mn, Cu)

247-V. Donegal DC-50. Precipitation-Hardening Cast Alloy. *Alloy Digest,* no. SS-17, Aug. 1954.

Composition, physical and mechanical properties, machinability, castability, weldability, corrosion resistance, pickling and cleaning and applications. (SS)

248-V. Vega. Air-Hardening Tool and Die Steel. *Alloy Digest,* no. TS-23. Aug. 1954.

Composition, physical and mechanical properties, heat treatment, machinability, workability, weldability and applications. (TS)

249-V. The Properties and Uses of Spheroidal Graphite Cast Iron. *Mechanical World and Engineering Record,* v. 134, July 1954, p. 297-299.

Mechanical and physical properties, castability. Applications replacing steel castings or forgings. Tables. (CI)

250-V. Facts Concerning White Metal Bearings. Howard Warburton. *Mechanical World and Engineering Record,* v. 134, July 1954, p. 309-311.

Physical and mechanical properties; bearing failures and methods of improvement.
(T7, P general, Q general, SG-c)

251-V. (German.) **New Aluminum-Tin Bearing Alloys.** B. Keysselitz. *Aluminium,* v. 30, no. 7, July 1954, p. 288-290.

Alloys of aluminum with 20 to 30% tin provide bearing material that will withstand high pressure and provide smooth running with steel shafts. Photographs, micrographs, table. 2 ref. (T7, Al, Sn)

252-V. (German.) **Hard Manganese Cast Steel.** E. Piwowarsky and H. L. Roes. *Giesserei,* v. 41, no. 14, July 8, 1954, p. 357-369.

Effects of addition elements on foundry practice, mechanical properties and phase transformations. Tables, graphs, micrographs, photographs, diagrams. 1 ref.
(E general, Q general, N general, CI, AY)

253-V. (German.) **Vanadium. Natural Deposits of a Technically "Young" Metal.** H. Bachmann. *Umschau in Wissenschaft und Technik,* v. 54, no. 14, July 15, 1954, p. 425-426.

Geology of ores, properties and applications of the metal and its alloys. Photographs, micrograph. (V)

254-V. (Book—German.) **(Alumina and Aluminum.) Tonerde und Aluminium.** v. II. **(Aluminum.) Das Aluminium.** Wilhelm Fulda and Hans Ginsberg. 385 p. 1953. Walter de Gruyter & Co., Berlin, W. 35. $11.00.

Results and experiences of industrial practice, 1920-1952. (Al)

255-V. (Book—German.) **(Gmelin's Handbook of Inorganic Chemistry. System no. 9. Sulfur. Part A, Section 3.) Gmelins Handbuch der anorganischen Chemie.** E. H. E. Pietsch, editor. 8th Ed. 252 p. 1953. Verlag Chemie, GmbH., Weinheim—Bergstrasse, West Germany. $34.00.

Physics and chemistry of elemental sulfur, including electrochemistry and behavior in presence of various substances. (S)

256-V. (Book—German.) **(Gmelin's Handbook of Inorganic Chemistry. System no. 10. Selenium. Part A, Section 3.) Gmelins Handbuch der anorganischen Chemie.** E. H. E. Pietsch, editor. 8th Ed. 184 p. 1953. Verlag Chemie, GmbH., Weinheim—Bergstrasse, West Germany. $26.64.

Properties, theory, manufacture and applications of selenium rectifiers and photocells. (Se)

257-V. (Book—German.) **(Gmelin's Handbook of Inorganic Chemistry. System no. 13. Boron Supplement Volume.) Gmelins Handbuch der anorganischen Chemie.** E. H. E. Pietsch, editor. 8th Ed. 253 p. 1954. Verlag Chemie, GmbH., Weinheim—Bergstrasse, West Germany. $33.60.

Occurrence, structure and properties of boron and its compounds. (B)

258-V. (Book—German.) **(Gmelin's Handbook of Inorganic Chemistry. System no. 62. Gold. Sections 2 and 3.) Gmelins Handbuch der anorganischen Chemie.** E. H. E. Pietsch, editor. 8th Ed. 306 and 558 p. 1954. Verlag Chemie, GmbH., Weinheim—Bergstrasse, West Germany. $40.32 and $74.88.

Section 2 covers history; occurrence; extractive and physical metallurgy. Formation and preparation of special modifications in pure state, such as colloidal gold. Surface treatment of gold and gold alloys. Section 3 includes properties, electrochemical and chemical behavior, structure and analysis of gold, its alloys and compounds. (Au)

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Invitation to Entrants

9th Metallographic Exhibit

Entries are invited in the 9th Metallographic Exhibit, to be held at the National Metal Exposition in Chicago the week of Nov. 1 through 5, 1954. Entries will be displayed to good advantage and awards will be given for the best micrographs as decided by a committee of judges.

Classifications of Micros

1. Toolsteels and tool materials
2. Stainless steels and heat resisting alloys
3. Other steels and irons, cast or wrought
4. Aluminum, magnesium, beryllium, titanium and their alloys
5. Copper, nickel, zinc, lead and their alloys
6. Metals and alloys not otherwise classified
7. Series showing transitions or changes during processing
8. Welds and other joining methods
9. Surface phenomena
10. Results by unconventional techniques (other than electron micrographs)
11. Slags, inclusions, refractories, cermets

Awards and Other Information

A committee of judges will be appointed by the Metal Congress management which will award a First Prize (a medal and blue ribbon) to the best in each classification. Honorable Mentions will also be awarded (with appropriate medals) to other photographs which, in the opinion of the judges, closely approach the winner in excellence. A Grand Prize, in the form of an engrossed certificate and a money award of $100, will also be awarded the exhibitor whose work is adjudged best in the show, and his exhibit shall become the property of the American Society for Metals for preservation and display in the Society's National headquarters in Cleveland.

All photographs may be retained by the Society for one year and placed in a traveling exhibit to the various Chapters. They will be returned to the owners in May 1955 if so desired.

Rules for Entrants

Work which has appeared in previous metallographic exhibits held by the American Society for Metals is unacceptable. Photographic prints shall be mounted on stiff cardboard; maximum dimensions should be limited to 15 by 22 in. Heavy, solid frames are not permissible because of difficulties in mounting the exhibit. Entries should carry a label on the face of the mount giving:

Classification of entry
Material, etchant, magnification
Any special information as desired

The name, company affiliation and postal address of the exhibitor should be placed on the BACK of the mount.

Transparencies or other items to be viewed by transmitted light must be mounted on light-tight boxes wired for plugging into lighting circuit, and built so they can be fixed to the wall.

Entrants living outside the U.S.A. should send their micrographs by first-class letter mail endorsed "Photo for Exhibition—May be opened for customs inspection." To be acceptable as first-class mail the package should measure no more than 35 x 45 cm. (14 x 18 in.)

Exhibits must be delivered before Oct. 15, 1954, either by prepaid express, registered parcel post or first-class letter mail, addressed to:

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The Employment Service Bureau is operated as a service to members of the American Society for Metals and no charge is made for advertising insertions. The "Positions Wanted" column, however, is restricted to members in good standing of the A.S.M. Ads are limited to 50 words and only one insertion of any one ad. Address answers care of A.S.M., 7301 Euclid Ave., Cleveland 3, O., unless otherwise stated.

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LIGHT METALS METALLURGIST: Ph.D. degree, age 44. Unusual broad background as manager of research and control laboratories, reduction plants, billet foundries, extrusion departments, tube and wire drawing departments. Box 9-90.

ENGINEERING TESTER: Two years experience with ferrous and nonferrous alloys. Three years in production and mechanical engineering fields. Married, two children. Can furnish excellent references. Desires to relocate in Denver area. Box 9-95.

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foundry. In charge of laboratories covering metallography, physical testing, chemical analysis, X-ray. Desires work requiring administrative ability and technical background in industry with challenging problems. Box 9-105.

CONSULTING METALLURGIST: Director of technical processes desires position in industry utilizing his background with possibility of managerial advancement. Registered professional engineer. Ferrous and nonferrous. Control laboratories, fabricating, plating, welding, heat treatment, including induction and flame hardening. Specifications and inspection systems to cover service requirements. Married, age 33, East Coast preferred. Box 9-110.

FURNACE ENGINEER: Age 37, married, three children. Studied at Carnegie Tech, 10 years experience in heat treating field, plus five years in the selection, purchase, installation and maintenance of all types of furnaces. Desires position with manufacturing company in engineering with opportunity for advancement. Box 9-115.

PHYSICAL METALLURGIST: With strong background in metallurgical engineering, seeks change in position. Well-grounded in fabrication, processing and property studies of commercial nonferrous and ferrous metals, zirconium, titanium, high-temperature and rare earth metals. Fifteen years diversified experience in heavy industry, automotive and atomic energy field, including seven years on nuclear reactors. Disposed, however, to broad field of metallurgical activities, supervisory and staff duties. Adaptable, cost conscious researcher with mature and tactful judgment. Thorough laboratory experience. M.S., Ph.D. degrees, linguist, age 40. Interested in responsible research planning, coordination or technical administration. Box 9-120.

METALLURGIST: Fifteen years experience as all-around factory worker plus education in metallurgy. Technical graduate 1952. Experience as metallurgist includes supervision of melting departments in gray iron cupola melting and mixes, chemical and sand testing, and nonferrous, brass and aluminum. Dependable, ambitious worker, excellent work record. Age 41, married, Ohio resident, but will relocate. Box 9-125.

METALLURGIST: B.S. in metallurgical engineering, age 34, six years ferrous-nonferrous experience, last two as process engineer in missile production. Responsibilities include process problems, new processes, materials, equipment. Experience includes heat treating, metallography, investment casting, sand casting, joining, powder metals. Desires position as process or materials engineer in missile or aircraft manufacture. Box 9-130.

METALLURGICAL ENGINEER: B.M.E. degree, age 27, married, children. Experience includes 3½ years diversified foundry, heat treating and welding work, 3 years ordnance research and development. Presently employed, desires position in any of the above fields. Box 9-135.

ELECTRICAL ENGINEER: Graduate, experienced in industrial electrical power layouts and installations. Design, installation, and use of oil, gas and electric industrial furnaces and allied equipment. Development of processing equipment. Plant layout. Desires responsible position with progressive company. Located now in eastern Pennsylvania but will consider relocation. Box 9-140.

METALLURGICAL ENGINEER: B.S. degree, age 31, married, veteran. Three years industrial experience in supervisory position. Experience includes metallography, physical testing, X-ray, welding, trouble shooting, development, report writing and contacts on technical problems. Worked with stainless steels, corrosion and heat resistant materials, medium and low alloys. Prefers south or west. Box 9-145.

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METALLURGISTS

Alloy Development — Includes composition development for high-temperature and magnetic alloys, phase diagrams, creep, precipitation hardening, vacuum melting and other techniques. Development experience in physical metallurgy or alloy systems, background in theoretical physical metallurgy and knowledge of solid state physics useful. M.S. or Ph.D. in metallurgical engineering. For application write: Westinghouse Electric Corp., Educational Dept., East Pittsburgh, Pa.

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Technical Personnel

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EMPLOYMENT SERVICE BUREAU

(Continued from p. 37)

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PHYSICAL METALLURGISTS OR MECHANICAL ENGINEERS

Wanted by progressive company for research program on mechanics of materials, including fatigue, vibrations, creep and other elevated temperature properties; laboratory located in area of attractive surroundings and pleasant climate in Northwest. Positions to be filled are:

(a) Senior investigator capable of planning and administration of at least part of the above program. Should have equivalent of Ph.D. with some additional research experience. Demonstrated success in industrial research accepted as substitute for advanced degree.

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Box 9-20, Metals Review

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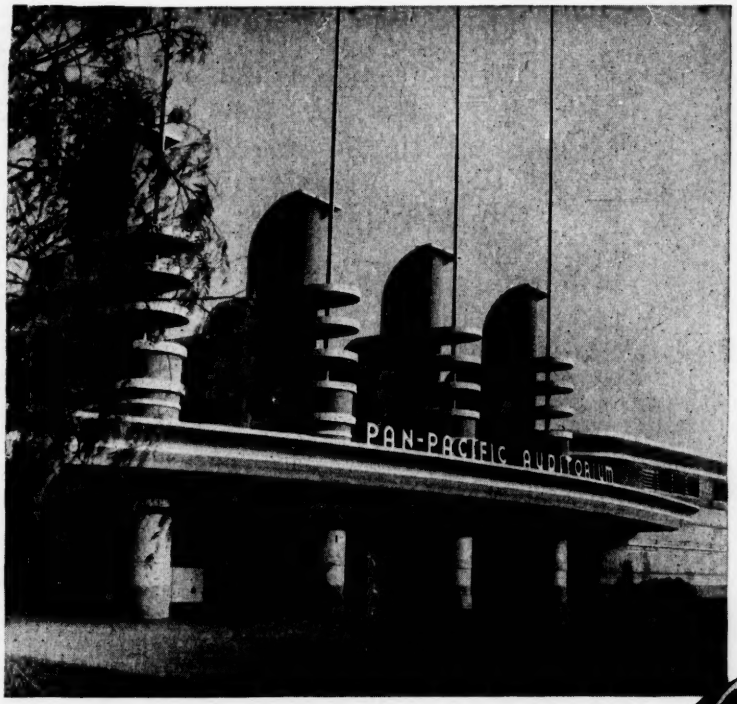

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Light Case 200	.001 - .010	1400 - 1650°F.	Carbon D
Hard Case 250	.001 - .025	1400 - 1650°F.	Carbon E
Hard Case 400	.001 - .040	1450 - 1750°F.	
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